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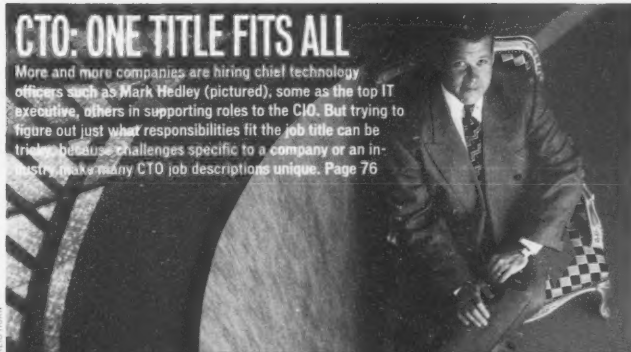
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CTO: ONE TITLE FITS ALL

More and more companies are hiring chief technology officers such as Mark Hedley (pictured), some as the top IT executive, others in supporting roles to the CIO. But trying to figure out just what responsibilities fit the job title can be tricky because challenges specific to a company or an industry make many CTO job descriptions unique. Page 76

REUTERS



HIRING THE INVISIBLE WORKFORCE

IT workers with disabilities remain one of the most overlooked segments of the workforce. Disabilities expert Richard Dodds (pictured), director of technology services at Community Options Inc., discusses how IT managers can do a better job of hiring and accommodating professionals with disabilities. Page 54



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AUGUST 7, 2000

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This Week Online



- This week on **Computerworld.com's Careers** page, Gartner Group's **Barbara Gomolski** (pictured) offers advice on how to help your employees feel that they own their projects.
- In the **Security Watch** pages, Deborah Radcliff reports on the **CERT Coordination Center** at Carnegie Mellon and how it joined the political mainstream at the **GOP** convention in Philadelphia.
- And in our **E-commerce** pages, read why **Lockheed Martin's** Missiles and Fire Control division turned to **business-to-business software** to solve design and manufacturing problems.

OPINIONS

- 30 **MARYFRAN JOHNSON** is pulling for the record industry in the Napster case. After all, corporate assets are at stake here — and elsewhere.
- 30 **BUT ALEX TORRALBAS** says he believes that the Napster saga has provided the record industry with a message: Get with the times.
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writes that the strength of the IT industry in the U.S. can also breed arrogance.

- 59 **JOE AUER** tells how companies can save money by shrinking the scope of their global software licenses.
- 86 **FRANK HAYES** asks why "good" organizations are behaving badly, while hackers are preaching better security, privacy and responsibility.

AT DEADLINE

States Object to Toysmart Settlement

The attorneys general of 44 states last week filed a legal brief in U.S. Bankruptcy Court in Boston, formally objecting to a proposed settlement between the Federal Trade Commission and Waltham, Mass.-based Toysmart.com Inc. that would allow the defunct online toy retailer to sell its customer data to another company under some circumstances.

Short Takes

INVENSYS PLC in London said it will cut 700 to 800 jobs to consolidate BAAN CO. in Herndon, Va., into its new software and systems division. . . . Sending unsolicited commercial e-mail, or spam, to cellular telephones would become illegal under legislation that U.S. Rep. Rush Holt (D-N.J.) says he will introduce when CONGRESS returns from its summer break. . . . THE WHITE HOUSE said it will ease export restrictions on shipments of high-performance computers to many countries, including India, China and Russia. . . . A Maryland neurologist filed an \$800 MILLION LAWSUIT against several wireless services providers, claiming that radiation from his cell phone is responsible for his malignant brain tumor.

Corrections

■ Due to a reporting error, the online capabilities of Washington-based GEICO Corp.'s Web site were incorrectly described in "Allstate to Begin National Rollout of Online Insurance Sales" (*Computerworld Online*, June 28). In all states except California, consumers can apply for and purchase policies online. The site also allows policyholders to make bill payments and numerous policy changes. GEICO's instant online auto quotes feature isn't available in New Jersey and Massachusetts.

■ Due to an editing error, Atlanta-based Nova Corp. was incorrectly identified in "Rules of Engagement" (*Business*, July 24). Also, the correct asset base of Calgary, Alberta-based TransCanada Pipelines Ltd. is \$26 billion (Canadian).

Project Bogs Down San Mateo Agency

Health-services operation's \$12 million integration attempt plagued with problems

BY JULEKHA DASH

AFTER INVESTING three years and more than \$12 million on a software system intended to better capture patient information, a state health agency is left with new software that takes 59% longer to collect bill payments and whose implementation has hit numerous snags.

Analysts and users said the situation highlights how poor project management can delay software implementations and interrupt business processes.

Maya Altman, deputy director at San Mateo Health Services Agency, a California county government health-services provider, said the \$12 million includes money spent on software, network upgrades, data servers and hardware, including 900 new desktop PCs.

In addition, the agency hired as many as 30 additional consultants whose cost Altman couldn't estimate, though they were paid from the \$23 million the agency spent on all information technology projects during the past three years.

In September 1997, the agency signed a seven-year, \$11 million contract with Shared Medical Systems Corp. (SMS) in Malvern, Pa., to install and customize nine applications, including pharmacy, lab, patient registration and billing applications.

But the system, which was also designed to make billing more efficient, has increased the time it takes to collect payments from an average of 75 days to 119 during the past year.

Altman couldn't put a number on the "higher cash deficit" that resulted, but he did say the agency's gross revenue is \$120 million per year.

While the goals of the system haven't been met, the agency is still better off than it was three years ago, when it

had 40 stand-alone systems, said Altman.

But the agency still doesn't have a common patient registration data repository, so caregivers don't know if a patient receiving mental-health services may have also received care in another division.

Mark Anderson, a vice president at Stamford, Conn.-based Meta Group Inc. and a former hospital CIO, said that such software failures are relatively common in the health-care industry because IT leaders typically aren't part of a hospital's executive team. As a result, there is less communication

Project Faults

What went wrong with San Mateo's software upgrade:

- Inadequate software testing and training due to Y2k deadline pressures
- Taking on too much in too little time
- High turnover of project managers

between business and IT, though failures are usually caught much earlier than they were at San Mateo.

So what went wrong at the health agency? For one thing, San Mateo was under deadline pressure to install the system prior to Jan. 1. That meant hir-

ing outside consultants at a time when demand and costs for IT services were at their peak, said Altman.

To complete the work on time, the agency had to shorten training and systems testing. Simultaneously working on year 2000 projects, upgrading the network and installing major software overstrained the agency, Altman said.

"We're definitely not blaming SMS. We had management issues of our own," she said.

But turnover at SMS also contributed to a bumpy implementation, the agency said. SMS assigned five project managers in 18 months, Altman said.

Maryellen Katrosh, a spokesperson at SMS, couldn't explain the turnover, but said at least one project manager was replaced at the request of the agency. She also said IT problems at the health agency resided not in the software but in the network infrastructure. Altman disagreed with Katrosh, citing the reasons she stated earlier. ■

Bank of America Says Layoffs Coming

Jobs sacrificed for tech investments

BY MARIA TROMBLY

Bank of America Corp. plans to lay off 9,000 to 10,000 employees in the next 12 months, company executives said last week, but it will expand its investments in technology — including an additional \$70 million for e-commerce projects.

Some of the job cuts will come from information technology, said Jay Butler, head of global corporate and investment banking technology at the company.

"They're across the board, so, yes, there will be cuts in the

technology area," he said. "But the cuts aren't directed at people who create value for our customers — we're looking at taking layers of management out so that people are closer to the customers and decisions can get made quicker." Butler declined to give further details.

The Charlotte, N.C.-based bank merged with NationsBank Corp. last year, so this is a good time to consolidate and move forward, analysts said.

"The company is a product of many, many mergers over the years," said David Stumpf, an analyst at St. Louis-based A. G. Edwards & Sons Inc. "No one ever stepped back and said, 'What is the optimal management structure of this new company?'"

The layoffs — as many as 10,000 people out of a total of 150,000 employees — should result in significant savings, Stumpf said.

Bank of America will focus additional IT investments in three major technology areas — e-commerce, credit-card and business-to-business payment systems and Web-enabling branches and call cen-

ters, Butler said.

Among the benefits of the Web connections, he said, would be the ability for branch and call center employees to call up the same customer data that the customers see when they log on to the bank's Web site.

Butler wouldn't disclose how much the bank spends on e-commerce, but he did say the \$70 million would pay out over six months or so.

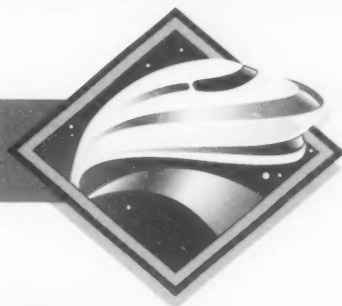
Bank of America will accelerate existing plans — including deals with dot-coms, such as trading and portfolio management firm Integral Development Corp.'s CFOWeb.com, business-exchange infrastructure company Ariba Inc. and Santa Clara, Calif.-based small business portal Biztro.com Inc. Integral and Ariba are both based in Mountain View, Calif.

According to George Barto, an analyst at Stamford, Conn.-based Gartner Group Inc., Bank of America is already ahead of the curve when it comes to online services, and the new focus will help accelerate its adoption of Internet technologies. ■

Bank of America's Technology Plans

- An extra \$70 million for e-commerce over the next six months
- More Internet technology in banking offices and call centers
- More investments in credit-card and payment businesses

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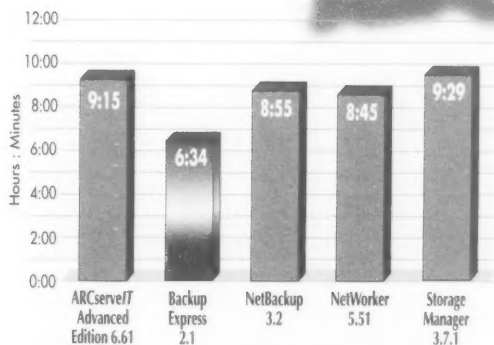
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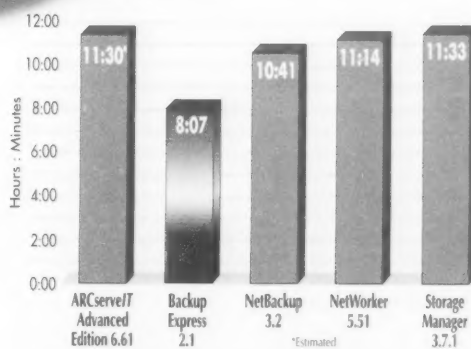
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Tom Iwanski, senior product reviewer,
Windows 2000 Magazine Lab Report (June 2000)



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GOP Gives High-Tech Issues a Light Touch

Republicans avoid taking hard positions, but some see clues to future directions

BY PATRICK THIBODEAU
WASHINGTON

AT THEIR convention in Philadelphia last week, Republicans avoided taking hard stands on just about all the major high-tech issues, including on-line privacy and Internet taxation.

But some people, such as John Palafoutas, senior vice president of domestic policy at the American Electronics Association, a Washington-based trade group, saw clues to the party's direction in its choice of speakers.

For instance, one of the speakers, Virginia Gov. James Gilmore, is a staunch opponent of requiring e-commerce sites to collect sales tax in states

where they have no legal obligation to do so. "Nobody got on the podium without George Bush's approval," said Palafoutas, who was at the convention.

But Republicans, like Democrats, are deeply split on the taxation issues. There are GOP governors, like Utah Gov. Mike Leavitt, who oppose Gilmore's views.

High-tech groups aren't expecting the Democrats to do or say anything much different at their upcoming convention.

"Fortunately, our issues are below the radar screen of partisan politics, and that's a good place to be," said Ken Wasch, president of the Software & Information Industry Association in Washington.

Although the GOP convention didn't stir the high-tech is-

ssues all that much, there are sharp battles being fought in Congress over privacy, taxation, H-1B visas and other technology-related issues.

Some information technology managers said they aren't sure yet how the election will affect the work they do.

Tim Brennan, a systems administrator at Burlington Coat Factory Warehouse Corp. in

Burlington, N.J., said he didn't see anything raised in the convention coverage he watched on television that would "change our course of action."

But Brennan said he would like the politicians to demonstrate an understanding of technology and a "willingness to continue supporting research and development."

Dan Orr, information systems director at Kokosing Construction Co. in Fredericktown, Ohio, said one thing he would like to see accomplished is for the government to get its "arms around the Internet," particularly in stopping online gambling. ▀

GOP's Platform on IT

When it came to high-tech issues, the Republicans last week offered general ideas but no real specifics on high-tech legislation.

Limited regulation: The GOP wants to "restrain the hand of government" on e-commerce and communication issues.

Internet taxation: The GOP platform calls for a continued moratorium on new and discriminatory Internet taxes, but it ducked addressing the larger sales tax collection issue.

Privacy: The GOP's stance on privacy protection is fuzzy at best. It makes a strong call for protecting personal privacy, but at the same time, it suggests that industry efforts on this issue may be enough.

E-GM Getting Lukewarm Reviews

BY LEE COPELAND

E-GM, the General Motors Corp. business unit that's charged with driving Internet initiatives within the automotive giant, recounted a year's worth of progress at a press conference last week. But analysts gave the unit low scores on efforts to improve consumers' online purchasing experiences and to rev up Web-based vehicles sales.

Since its launch last August, the 150-person division has boosted traffic at GM's consumer Web site, GMBuyPower.com, from 200,000 visitors in March to 1.2 million monthly visitors now, said Mark Hogan, e-GM's president. Meanwhile, the number of inventory searches conducted on the site and the number of consumer-to-dealer messages have jumped 130% and 85%, respectively, since April, he said.

Hogan said efforts by e-GM have improved its vehicle sales. For example, 27,000 sales made in the past year resulted from leads that were generated through GMBuyPower, said Hogan. Of that number, 20,000 were designated "conquest" sales, or sales from consumers who owned or were interested in vehicles from other makers.

But analysts said the sales results demonstrated e-GM's slow progress and cautioned the automaker to involve its 7,700 dealers more closely.

"Frankly, that number seems small given the size of GM," said Dan Garretson, an analyst at Forrester Research Inc. in Cambridge, Mass. "GM needs to work with its dealers to facilitate more sales."

Robert DeSisto, an analyst at Gartner Group Inc. in Stamford, Conn., also said more work needs to be done with dealers.

"One thing that e-GM has not addressed — the key thing — is how it will help reinvent the business model with dealers," he said. "Dealers cannot get rid of the fact that people can [now] get access to dealer invoices online, so margins are getting squeezed." ▀

Boo.com Makeover Draws Skeptical Reactions at Unveiling

Analysts, retailers question new model

BY CAROL SLIWA
NEW YORK

Tragically hip Boo.com crashed with a loud thud in May when investors pulled the rug out from under the London-based retailer's bold, free-spending attempt to become the first online fashion retailer to succeed on an international scale.

Now, the New York-based company that acquired Boo.com's trademark, Web addresses and content is facing skepticism about the business model behind a planned relaunch of the brand this fall.

At last week's eTail 2000 conference held here, FashionMall.com Inc. unveiled plans to launch a more frugal Boo.com under a phased-in approach that will free the company from the burden of supporting inventory, distribution centers, fulfillment, customer

service and heavy staffing.

But no sooner had the company unveiled its plans than some industry observers started to poke holes in the concept. The detractors claim that Boo.com runs the double-edged risks of confusing or alienating customers who may have to turn to multiple companies for service while looking for partners who are able to distribute goods for individual customers.

Boo.com "spent 20 minutes advertising and they think that's all they have to do. The fantasy that you can do a virtual storefront with no physical distribution or control of fulfillment is just that — a fantasy," said Kathleen Biro, president of Digitas Inc., an Internet professional services company in Boston that counts L. L. Bean Inc., The Neiman Marcus Group Inc.

and General Motors Corp. among its clients.

FashionMall.com CEO Ben Narasin disagrees. "We've had actual experience with this, so our self-skepticism is much lower" than others', he said.

Visitors to Boo.com will find an array of products for sale.

Once they click on a product image to buy the item, they will be linked to the site of the manufacturer or retailer, officials said. At what point customers will be linked to the outside site is still being worked out.

"We don't want to have a situation where we send you into a store and you wander at will" through a selection of 200,000 products when "only 200 are very Boo," Narasin said.

Customer purchases will be aggregated into one shopping cart, but anyone buying items from more than one vendor

will receive multiple shipments and bills.

Boo.com runs the risk of giving consumers "a completely inconsistent experience across the site," said Seema Williams, an analyst at Cambridge, Mass.-based Forrester Research Inc.

Boo.com's new president, Kate Buggeln, who joined the company last week, is trying to establish partnerships with e-commerce-enabled manufacturers and retailers of hip and hot merchandise. But Narasin notes that she will be careful in choosing partners because each will be handling distribution and customer service.

Established catalog retailer Spiegel Inc. understands the challenge she is facing.

Richard Burke, a divisional vice president at the Downers Grove, Ill., company said Spiegel counts on "big, reliable" companies to ship about 20% of its merchandise, "and if there's any question on their reliability, we don't drop-ship with them." ▀



FASHIONMALL'S Ben Narasin: "Our self-skepticism is much lower"

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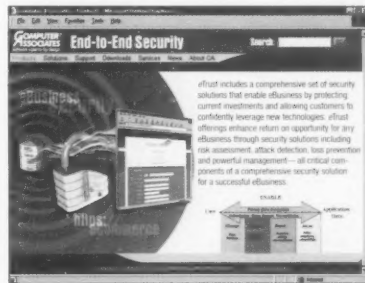
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BRIEFS

Navy Buys Computer To Track Weather

The U.S. Navy has signed an \$18 million contract with IBM for a new supercomputer to track weather near its fleet operations. The RS/6000 SP will allow the creation of the most detailed model of the world's oceans ever constructed. Ocean depth, temperature and even wave height will be modeled.

Microsoft Asks Court To Dismiss Suits

Microsoft Corp. is seeking to dismiss more than half of the 62 private, class-action antitrust lawsuits that have been consolidated and are under review by the U.S. District Court. Microsoft attorney David Tulchin said Thursday that the motion filed last week in Baltimore seeks to dismiss 37 of the cases on the grounds that indirect purchasers can't sue for damages.

StorageTek Turns Second-Quarter Profit

On the heels of naming Patrick Martin its new CEO, Storage Technology Corp. in Louisville, Colo., last week reported \$8.7 million, or 9 cents per share, in second-quarter profits, beating Wall Street's expectations. Those numbers exclude restructuring costs of \$12.4 million. According to First Call Corp. in Boston, Wall Street expected StorageTek to earn 5 cents per share for the second quarter. Including the one-time, pretax restructuring charges, the company's profits totaled \$651,000. StorageTek reported \$38.5 million in losses for the same period last year.

Short Takes

QLOGIC CORP. in Aliso Viejo, Calif., completed its \$1.7 billion stock deal to buy Fibre Channel switch maker ANCOR COMMUNICATIONS INC. in Eden Prairie, Minn. . . . The FEDERAL COMMUNICATIONS COMMISSION said the auction of licenses in the 747/762- and 777/792-MHz UHF TV bands, scheduled to begin next month, is postponed until March to provide more time for bidder preparation and planning.

Caldera Plans to Keep UnixWare Proprietary

Linux vendor faces credibility questions among users in open-source community

BY DOMINIQUE DECKMYN

THE ACQUISITION by Caldera Systems Inc. of the Unix server and services businesses of The Santa Cruz Operation Inc. (SCO) has the potential to split the open-source community. And while SCO users said they're relieved to see the products survive, some doubt whether Caldera is the right company to drive them further.

For about \$120 million in cash and stock, Linux vendor Caldera last week obtained a strong distribution channel, a sorely needed services operation and the UnixWare operating system, as well as exclusive rights to resell the legacy OpenServer operating system.

Staying True to Linux Roots

Caldera must merge open-source and proprietary product lines without betraying its roots in the Linux community.

Orem, Utah-based Caldera said it would create an "open Internet platform," scaling from thin clients to the data center. On the high end, it will offer UnixWare and an upcoming 64-bit Unix that will result from Project Monterey, a joint effort by IBM and SCO. Both will run Linux binaries, but unlike Linux, their source code can't be freely redistributed.

In a conference call with analysts, Caldera CEO Ransom Love said developers would get access to all Caldera source code, but that Caldera would hold on to ownership of parts of the code. "Ownership [of code] is not a bad thing, it's actually a good thing," said Love. "It protects [code] quality."

"They are walking a thin line between open source and a proprietary operating system," said Stacey Quandt, an analyst at Giga Information Group Inc. in Santa Clara, Calif.

Eric Raymond, a prominent open-source advocate and au-

thor of *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary* (O'Reilly & Associates, 1999) put it more bluntly: "If Caldera fails to open-source the core Unix technology, their credibility in the [Linux] community will be

more than hurt — it will be utterly destroyed."

Analysts also said they doubt whether Caldera will take over Santa Cruz, Calif.-based SCO's role as a partner in Project Monterey. An IBM spokeswoman said the acquisition's impact on Monterey "has yet to be determined."

SCO has struggled with positioning just two Unix versions.

"As a customer [of SCO], I didn't know if I should upgrade to a newer version of OpenServer or switch to UnixWare, which they seemed to pay more attention to, or if I should wait for them to merge into a single product," said Gene Christian, technical operations manager at Goldsmiths Inc. in Wichita, Kan. Caldera must now balance four operating systems.

"I think there are practical migration problems for [UnixWare and OpenServer value-added resellers] and users that haven't been addressed," said George Weiss, an analyst at Stamford, Conn.-based Gartner Group Inc.

Weiss said SCO's UnixWare may not be the ideal Unix version to fulfill Love's vision of a platform that scales to the data center, because SCO's customer base is mainly small and medium-size businesses.

As a customer [of SCO], I didn't know if I should upgrade to a newer version of OpenServer or switch to UnixWare.

GENE CHRISTIAN, TECHNICAL OPERATIONS MANAGER, GOLDSMITHS INC.

Vendors, Developers Waiting for Linux 2.4

New distribution versions are ready for updated kernel

BY DOMINIQUE DECKMYN

With the release of the much-anticipated 2.4 version of the Linux kernel still slipping, Linux vendors are previewing new versions of their distributions that are ready for the updated kernel.

Two weeks ago, the Linux kernel developers, headed by creator Linus Torvalds, released Version 2.4.0-Test5.

In an e-mail interview, kernel developer Alan Cox said it

was uncertain how many more "test" versions will be needed before the kernel is stable. "A lot of the major [Linux] authors certainly want more formal and planned freezing and debugging phases. That depends on the will of the community, and right now I think there is a lot of it," said Cox.

Meanwhile, Caldera Systems Inc. has started selling a "developer preview" operating system featuring a beta version of the 2.4 kernel, as well as Sun Microsystems Inc.'s Java HotSpot technology and an early version of the new KDE 2.0 user interface.

A Caldera spokesman said

Deal Highlights

Caldera's acquisition of SCO will bring:

Caldera:

- UnixWare product (Unix for Intel)
- Exclusive license to resell OpenServer (legacy Unix for Intel)
- About 900 SCO employees
- SCO logo and dealer channel

SCO:

- About \$120 million in cash and stock
- Retention of Tarantella middleware and ownership of OpenServer

And unlike IBM or Compaq Computer Corp., which are entering the Linux market, Caldera can't offer customers an integrated software and hardware solution, Weiss said.

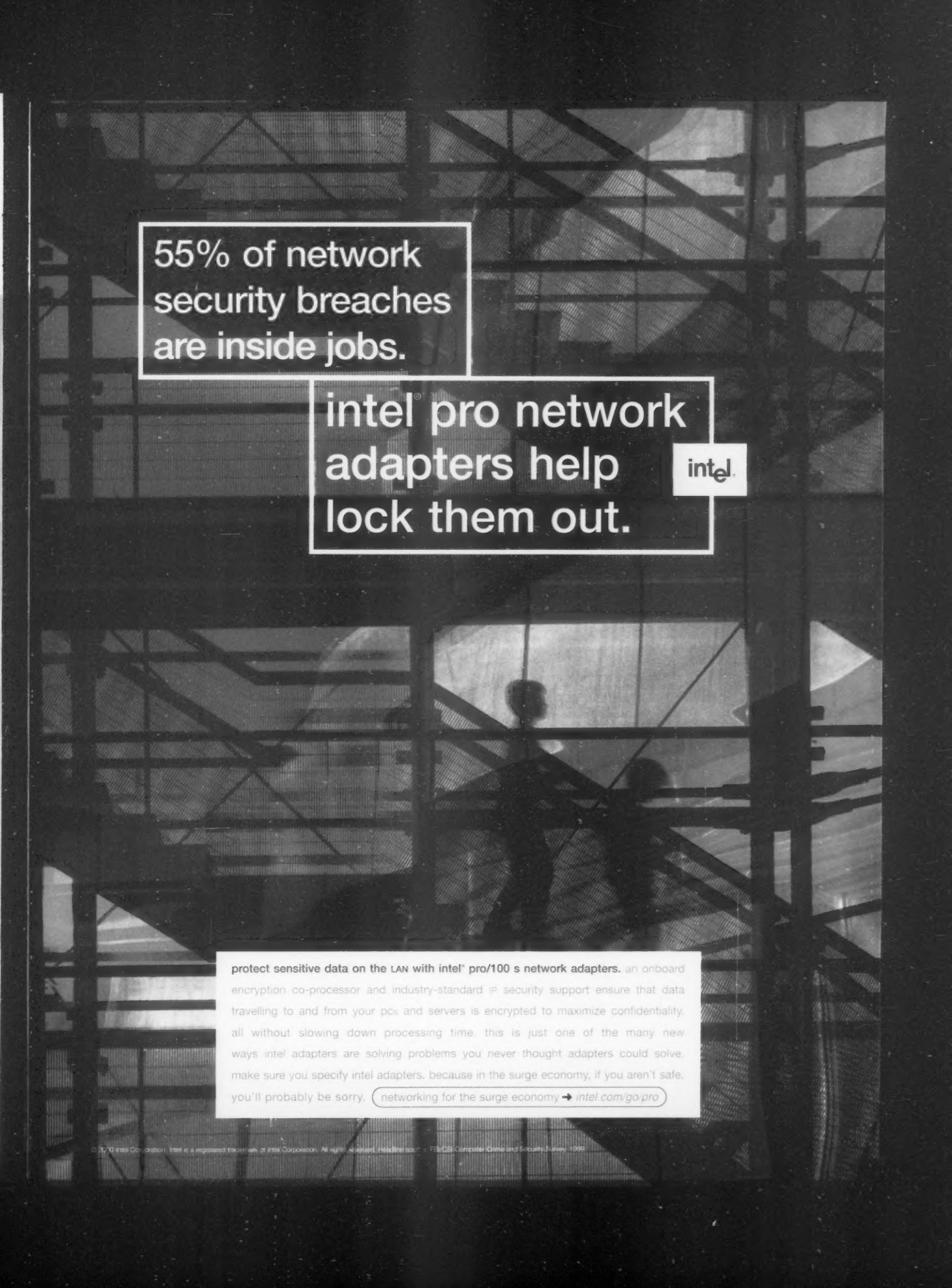
One SCO UnixWare user, Tom Pratt, an information systems manager at Coastal Transportation Inc. in Seattle, said he's relieved by the deal. "I didn't know how long [SCO was] going to be in business," he said. Pratt said he's now more likely to turn to Caldera's OpenLinux than another Linux version.

Others said they have less confidence in Caldera. "I do think that there are good things about both OpenServer and UnixWare that could be integrated with Linux, but I have serious doubts about Caldera's ability to do it right," said Christian. ■

the company expects the final kernel this fall and hopes to ship it as part of its distribution before the end of the year.

Linux market leader Red Hat Inc. in Research Triangle Park, N.C., is offering for download Red Hat Linux 7.0, which will initially use the current 2.2 Linux kernel but will support the 2.4 kernel when it becomes available.

The 2.4 kernel is of great importance to corporate Linux users because it addresses scalability, offering better support for symmetric multiprocessing, faster I/O and support for large file sizes and up to 64GB of RAM. ■



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Freight Logistics Company Takes IM Route

BY LINDA ROSENCRANCE

GoFreight.com Inc., a privately held technology company in Dallas, last week unveiled in-

stant messaging software that it claims will change the way the transportation industry does business.

Analysts and prospective customers aren't as convinced.

GoFreight I.O, which will become available Sept. 30 as a

hosted application service, combines applications specific to the transportation industry with an instant messaging (IM) service, said company President Randy Dryburgh. He said GoFreight is in the process of

lining up companies to beta-test the system.

GoFreight will enable small to medium-size (up to 500 employees) shippers, carriers and logistics providers to post and book loads faster and more economically than by conventional means, Dryburgh said. Now, most of these companies book freight by telephone, although a few have begun using online exchanges, according to Donald Broughton, a transportation analyst at A.G. Edwards & Sons Inc. in St. Louis.

Data Delivered Fresh

GoFreight is aiming to improve upon what online exchanges have delivered. "Too often, data in transportation industry [online exchanges] is stale — it's been sitting there for a long time — and has a high percentage of invalidity," Dryburgh said. Online exchanges such as Celarix Inc. in Cambridge, Mass., and Logistics.com in Burlington, Mass., allow companies to post loads and services to a Web site, but, Dryburgh said, "they don't allow them to communicate with each other, except by [phone], which can be a major expense."

Transportation and distribution companies have been conducting business and communicating instantaneously for some time, said Ting Piper, an analyst at International Data Corp. in Framingham, Mass.

For example, RightFreight.com, Nistevo Corp. and GoCargo.com Inc. all provide real-time communication via e-mail or an IM service, said Piper.

But Dryburgh contends that his company's service is different because it will deliver logistics and other information directly to its subscribers rather than posting the data to a database where customers have to retrieve it.

Mark McDowell, webmaster at Lyondell Chemical Co. in Houston, said he wasn't sure if his company would use this type of service. "I would have to look at its functionality. I think GoFreight is just trying to get on the bandwagon of the instant messaging phase," said McDowell.

Broughton said, shippers and carriers would have to conduct more business on the Web before an IM service would appeal to them. "If [companies] are still booking freight by phone, of what added value is instant messaging? None," he said. ■



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COMPAQ

Experts Warn of Lotus Holes

Domino, Notes vulnerabilities aren't new; require sophisticated attacks to do damage

BY JENNIFER DISABATINO

DUTCH ENGINEERS recently found a pair of holes in Lotus Notes and Domino that the vendor acknowledges exist: one involving password encryption, and one regarding the security on public versions of the address list.

Trust Factory BV, a Nether-

lands-based security consulting firm, warned attendees at the Def Con-8 conference in Las Vegas last weekend of the holes. The alphanumeric strings (or hashes) to which passwords are converted when they are encrypted can be matched against a master password encryption key and used as a live password by users on the same server.

Matthew Devost, one of the

presenters at the Secure Design International Group press conference, said a cracker can access the hashes with a few commands through a Web browser if the address list is publicly available there.

Though cracking an organization's system in this way would require a pretty high level of sophistication, Web-based systems are particularly vulnerable, the Trust Factory said. However, that technique is valid only if the user has the same password for Web and server access, according to Lotus Development Corp.

Devost said Notes administrators can protect their databases simply by "salting" hashes — adding a random number into the scrambled alphanumeric string that represents a password. This function is built into newer versions of both Domino and Notes.

Domino product managers Kevin Lynch and Katherine Spanbauer said Lotus has advised users of these vulnerabilities for some time and urged administrators to use the salted encryption. However, some systems need the unsalted version to remain backward-

compatible in a mixed shop.

"Simply use the other hash that's been available since [Notes Version] 4.6, and you will no longer be able to perpetrate that attack," Lynch said.

"It's an extremely sophisticated style of attack, and the attacker would have to already have internal access to resources," Spanbauer said. The attacker would also need special software.

However, Devost said, another way to break the hashes is through a brute-force attack designed to grab the recipient's personal information and send it back to the author of the code. Even salted hashes could be sent back to a cracker in this way, Devost said. ▀

Plugging the Hole

Trust Factory and SDI suggest taking the following steps to protect your Notes database:

- Restrict access from the Web
- Choose different passwords for ID and HTTP accounts
- Store ID files on removable media
- Manually upgrade to the stronger hash
- Exit Notes completely
- Never click on e-mail attachments

Def Con Attendees Share Security Stories

BY ANN HARRISON
LAS VEGAS

Unsuspecting attendees logging on to the wireless network at the Def Con hackers convention here last weekend immediately found themselves targets in the event's annual "capture the flag" hacking competition. One visitor found his machine pinged within 10

seconds and had several of his Windows utilities disabled within minutes — but that was all part of the fun.

Now in its eighth year, Def Con has grown from a small private party to a large hacker social event featuring workshops on exploitable vulnerabilities, defense strategies and the latest security technology

and tools. It attracts hackers from around the world.

This year's event also drew officials from the CIA, the National Security Agency and the U.S. Department of Defense, making the annual game of "spot the fed" an easy exercise. During the opening session, Arthur Money, CIO at the Pentagon, gamely thanked audi-

ence members for withholding attacks against the Pentagon's systems during the Y2k transition and appealed to attendees to use their talents on behalf of the U.S. government.

"More hackers are getting their lunch money from the feds as they work with security companies and the [government]," said Tweetyfish, a member of the hacking group Cult of the Dead Cow. "All the cool stuff [is] happening on the Internet now, and the cool stuff happening in security is being built by hackers."

One of the most anticipated events was the annual presentation by the Cult of the Dead Cow, which released the Back Orifice hacking tool at Def Con in 1998. This year, members offered information on a type of denial-of-service attack that can disable NetBIOS services on Windows machines.

The NetBIOS protocol flaw was described by a Cult of the Dead Cow member. He developed a tool called NBName that he said can exploit the hole by rejecting all name-registration requests received by servers on TCP/IP networks.

However, Microsoft Corp. last week posted an advisory on its Web site saying that the company is aware of the NetBIOS vulnerability. ▀

Software Vendor Questions Disclosure of Vulnerabilities

Says there's been little impact in fixes

BY ANN HARRISON
LAS VEGAS

In a contentious keynote speech that created an uproar at the Black Hat Briefings security conference here, security researcher Marcus Ranum charged that the full disclosure of software vulnerabilities isn't improving computer security. Instead, Ranum said, it only encourages attacks by what he called "armies of script kiddies."

Many security experts and corporate users say that publicizing flaws will improve security by forcing software vendors to improve the quality of products and to quickly fix

potentially damaging bugs — a point that was reiterated by several audience members and speakers at the conference.

But Ranum, CEO of security software vendor Network Flight Recorder Inc. in Rockville, Md., argued that neither of those things is happening. Declaring a "call to arms to change how we perceive security," Ranum took aim at the practice of posting detailed information about software flaws and security holes on the Internet.

Even with all that information being made available, there hasn't been an appreciable impact on the turnaround times for fixing bugs, Ranum said. He asked, "If full disclosure is working, why isn't the state of security improving?"

Ranum claimed that many



@STAKE INC.'S Mudge says as much vulnerability information as possible should be disclosed

disclosures of holes are "rock-throwing" incidents done by companies or individuals to attack vendors or for the purposes of self-promotion, financial gain or ego gratification. And, he said, such disclosures give attackers tools that they can use to take down Web sites.

But other attendees at the conference, which was held two weeks ago, said they're skeptical that limiting the disclosure of information would benefit companies.

Mudge, a vice president at Cambridge, Mass.-based security consulting firm @Stake Inc. who goes by only one name, rejected what he called the "metered dissemination of information" about potentially damaging security holes. While the number of exploits by so-called script kiddies and other attackers has increased, widespread publicity about the incidents have helped raise security awareness, he said.

As much vulnerability information as possible should be disclosed in the hopes that responsible users will employ it to protect their companies, Mudge added. "If I took that [information] away from you, you wouldn't be able to defend your system," he said.

Others seconded Mudge's comments. "How do you give information to people [so they can] manage risk without giving it to other people?" asked Eric Pulaski, chairman and chief technology officer at BindView, a Houston-based security consulting firm. ▀

Patch Is Posted

A patch addressing the NetBIOS problem on Windows 2000 systems can be downloaded from www.microsoft.com/Downloads/Release.asp?ReleaseID=23370.



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BRIEFS

EC Says Microsoft Is Anticompetitive

The European Commission last week charged Microsoft Corp. with abusing its position in the PC operating systems market by attempting to leverage that power to give itself an advantage over competitors in the server software market. Based on evidence supplied by Sun Microsystems Inc. — one of Microsoft's most bitter rivals — the commission claimed that the software vendor breached European Union antitrust rules by engaging in discriminatory licensing and by refusing to give some of its server operating system competitors sufficient information about its Windows interfaces.

Cisco Gets in 3G Gear With IPmobile Buy

Cisco Systems Inc. in San Jose last week announced that it will acquire wireless Internet equipment vendor IPmobile Inc. in a \$425 million stock swap. Richardson, Texas-based IPmobile specializes in IP Radio Access Networks (RAN), which connect wireless base stations to the Internet in third-generation networks. Finnish mobile phone company Nokia Corp. in February announced its own IP RAN concept for supporting quality of service in mobile voice and data networks.

Amazon.com Hit With Pricing Glitch

Shoppers last week took advantage of a pricing glitch at Amazon.com Inc. and ordered toys at erroneously posted prices that were much lower than the actual prices. Seattle-based Amazon.com didn't return calls for comment, so the precise nature of the problem is unclear.

David Cooperstein, an analyst at Forrester Research Inc. in Cambridge, Mass., said the error points to a more widespread problem. "This isn't the first time there have been pricing glitches at [a Web site]," he said. "This [highlights] the problem of content management and pricing management systems. Companies have to have better workflow management to make sure that the prices that are posted are the right prices before a shopper [sees them]."

Saks to Launch Online Billing, Customer Service

Retailer plans to deliver personalized marketing messages with customers' bills

BY JAIKUMAR VIJAYAN

SAKS INC. IS rolling out a new online bill payment system that the retail giant is betting will also boost its ability to deliver highly tailored marketing messages to customers.

The \$6.4 billion Birmingham, Ala.-based operator of department stores like Saks Fifth Avenue, Proffitt's and Parisian recently signed up with Natick, Mass.-based Edocs Inc. to implement an Internet billing and customer relationship management platform.

When it's deployed later this year, the technology will let Saks customers pay their credit-card bills online and receive previews of sales events, exclusive promotions, giveaways and other targeted perks, based on their billing profiles, said Michael Rodgers, Saks' vice president of credit.

Connecting With Customers

Saks is an example of the brick-and-mortar retailers that are attempting to take advantage early of online billing software to establish interactive relationships with their best customers, said Avivah Litan, an analyst at Gartner Group Inc. in Stamford, Conn.

"What's really driving companies like Saks is the ability this gives for them to target their marketing much more effectively" at their most profitable customers, Litan said.

"A lot of players in this space are trying to demonstrate that there is a value to this beyond just presenting a bill over the Internet," agreed Paul Hughes, an analyst at The Yankee Group in Boston. "The bill is just the hookup mechanism."

The real return on investment comes from the potential to embed very customer-specific marketing messages — based on previous purchasing behavior — in online billing

statements, Rodgers said.

In the case of Saks — which has 357 stores in 39 states — Edocs' BillDirect software is providing this capability.

The technology lets Saks transform its legacy billing data into a format that can be presented, accessed and manipulated over the Web. Saks customers will be able to view statements that go back six months and ask questions or dispute line items with cus-

tomers' representatives via online chat sessions.

Saks is also implementing Edocs' MarketWorkz software, which allows for rules-based profiles to be built using data contained in a customer's billing statement, such as types of purchases the customer has

made, frequency of purchases, amount spent or ZIP code.

"You can have rules that say, 'If a cardholder carries a balance of more than \$2,000 a month and lives in this area and is part of this demographic group, then show them the XYZ offer,'" according to Jim Moran, a co-founder of Edocs.



SAKS' MICHAEL RODGERS says marketing messages are a great payback if they lift sales

Continued from page 1

Pandescic

desic last week was "still very good." But the company said it was trying to place its employees in other jobs, a move that could jeopardize that support as the ASP's staff hits the exit doors.

Details about a transition have been skimpy. Parziale said Folded Edge is concerned because it has received "no road map" yet, but he added that he isn't panicking because he has received verbal assurances from Pandescic's support staff that a transition plan is forthcoming.

Brett Lauter, chief marketing officer at Portland, Ore.-based eVineyards Inc., was equally sanguine. "We are in discussions with Pandescic about future steps," he said. Other sources told *Computerworld* that they expect Pandescic to keep customers' Web sites live until Jan. 31, at which time the plug will be pulled.

Neither Intel nor SAP spokesmen would comment on the options under consideration by Pandescic's board of directors, which is led by Intel

and SAP executives. Intel said that after three years of business, the board concluded that Pandescic's business model was "not going to reach profitability in a timely manner."

Pandescic takes approximately 2% of a retail site's revenue, plus low hosting fees. As Dell'Antonia put it, "The more successful we are, the more successful they would be."

Dell'Antonia said that although OshKosh B'Gosh's online sales are a relatively small part of the apparel maker's \$429 million in revenue, they aren't insignificant. With more than 100 other Pandescic customers generating cash, he said, it's difficult to believe no one would be interested in keeping Pandescic's business afloat.

He added that he would have considered new pricing with a new owner or with Pandescic to avoid the transition costs he now faces.

Pandescic's troubles may hurt other ASPs as users reconsider ASPs' viability. In the midst of evaluating an ASP for his site-selection business, Chris Engle, director of research at Angelou Economics Advisors Inc. in Austin, Texas, said Pandescic's problems undermine "trusting

Saks will use such profiles to cross-sell products from companies it has partnerships with and to target customers for its own marketing messages more effectively, Rodgers said.

"I can show you exactly what you want to see, to drive your purchases," Rodgers said. "It's a great payback if we can generate even a minor sales lift."

Rodgers wouldn't say how much it will cost Saks to implement the billing technology.

"I can tell you, it's not cheap," said Rodgers. But the system will immediately pay for itself through operational savings if a mere 5% of the 3.5 million customers billed monthly by Saks opt to receive all their bills electronically, he said. ■

internal operations to an ASP."

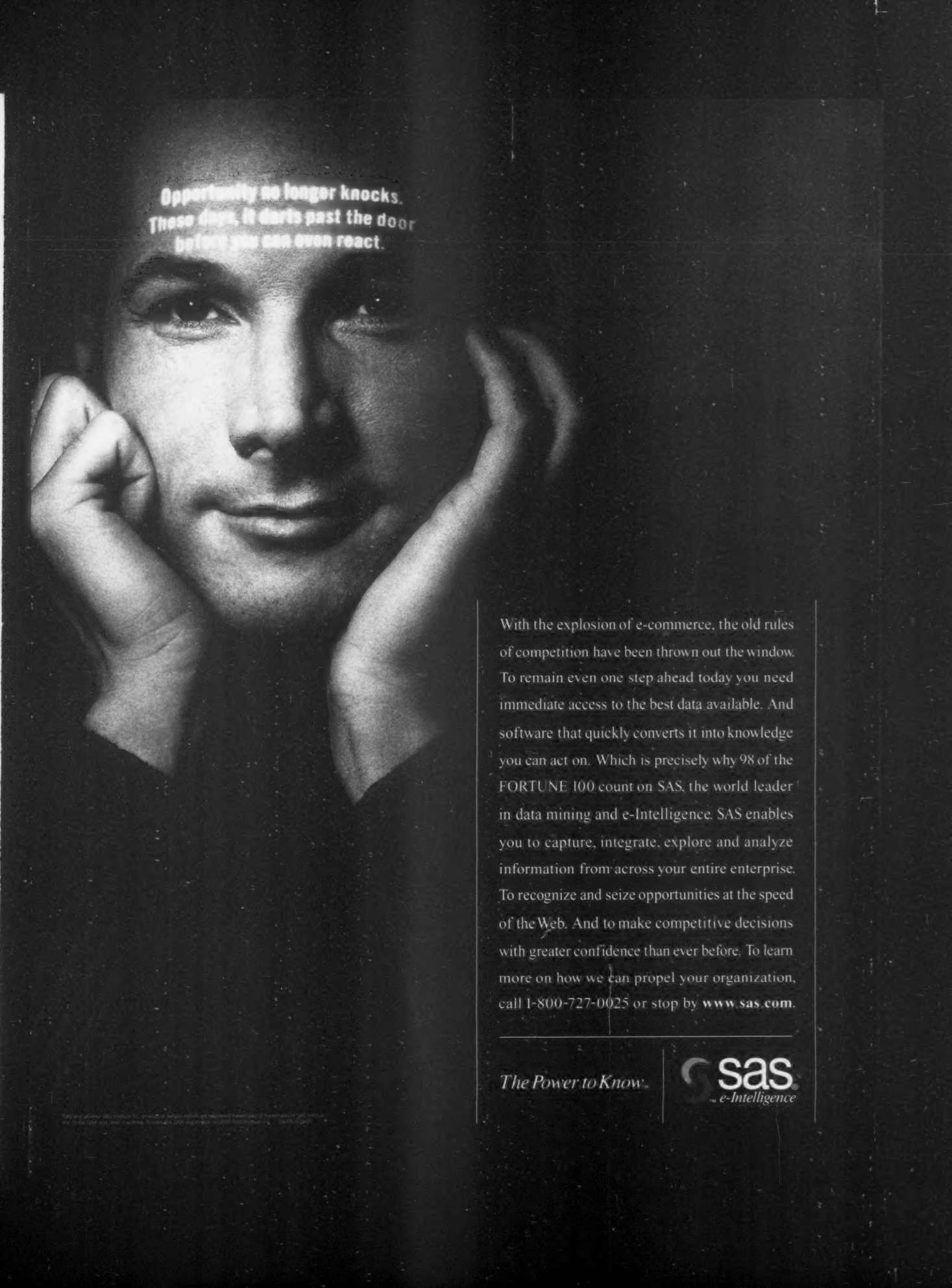
But, Lauter added, "we're no more wary of ASPs than we were before." And Dell'Antonia said he is already searching for another ASP to pick up hosting duties.

The Pandescic experience does augur some changes to OshKosh B'Gosh's online retail operations, however. Dell'Antonia said he's inclined to bring some of them in-house for the first time.

Adam Braunstein, an analyst at Robert Francis Group Inc. in Westport, Conn., said that despite Pandescic's sudden departure, IT executives should continue to use ASPs when appropriate. He suggested that users ask an ASP to show financial reports so they can ascertain the provider's long-term viability. "But don't bet your business on one," he said.

Users said a key Pandescic advantage was its deep-pocketed parents. Parziale said the idea that "keeping Pandescic alive would be a drop in the bucket" for Intel and SAP had helped reassure him that Pandescic would be stable.

"It's like two large parents fighting over a child and then just killing it," Parziale said. "It's sad." ■



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Windows 2000

to test SP1 with their particular mix of hardware and software and to check with their vendors. "We need a few weeks for [SP1] to prove itself, to see whether it is the [stable Windows 2000] version we have been waiting for," said Silver. Gartner has been cautioning corporations to hold back on widespread server rollouts.

Since the operating system's launch in February, Windows 2000 adoption has been "respectable but certainly not overwhelming," said Dwight Davis, an analyst at Boston-based Summit Strategies Inc. Although Microsoft says Windows 2000 sales have topped 3 million and exceeded internal projections, according to lead product manager Mark Croft, Davis said the vast majority of installations have been on workstations, not

Moving Windows Forward

Windows 2000 Service Pack 1

What it is: Bug fixes and security patches for Windows 2000

Features: New installation procedure eliminates need for separate installation of operating system and service pack

Why: Analysts have recommended waiting for SP1 before widespread server rollouts

When: Available now

servers. (Microsoft doesn't break out the figures.) "And more often than not, it is being deployed for the improved stability [rather than for the new features]," said Davis.

Besides the lack of a service pack — which contains fixes for problems identified with the product so far — users and analysts said several other factors have been holding back Windows 2000.

"One of the biggest things holding us up is [the delayed shipment of] Exchange 2000," said Watts. Exchange 2000 was originally due shortly after Windows 2000 and is now ex-

pected to ship in the fall. Several other products that leverage Windows 2000's features are due by the end of the year.

"Applications in general are in limited supply for Windows 2000," said Al Gillen, an analyst at International Data Corp. (IDC) in Framingham, Mass.

But Gillen said Windows 2000 is selling slightly faster than IDC had anticipated when the operating system was launched in February. Microsoft may sell as many as 10 million copies by the end of the year — half as many as the expected 20 million copies of Windows NT 4.0. Still, most

analysts interviewed characterized sales as slow.

Also holding back Windows 2000 are problems that some corporations are having in setting up Active Directory. Active Directory design can take up to 15 months in complex environments, said Silver. He said he expects most U.S. corporations to have some Windows 2000 installations by next year's first quarter.

Separately, Microsoft is preparing to launch on Oct. 11 the first beta version of Whistler, a Windows upgrade due sometime next year. Whistler will be the first Windows version to include some of the next-generation technologies that are part of the Microsoft .Net strategy. These will include an early version of a new browser-like graphical user interface aimed mainly at consumers.

Domenick Branciforte, enterprise architect at Royal & SunAlliance in Charlotte, N.C., said he will be watching the beta testing closely. "The real

driver for us to evaluate the beta of Whistler will be to provide the best platform for the new Visual Studio .Net developer tools," said Branciforte. The .Net concept is already leading the insurance company to focus developer training on XML and Simple Object Access Protocol, two key components of Microsoft .Net. ■

Ford to Offer Wireless Services

BY LEE COPELAND

In a bid to pass its top Motor City rival, Ford Motor Co. last week launched a joint venture called Wingcast with San Diego-based partner Qualcomm Inc. to deliver in-vehicle wireless services.

But analysts said that as more automakers offer telematics — in-vehicle communications such as cellular calling, Internet access and emergency assistance services — these high-end novelties will soon become standard options on most vehicles. Nonetheless, telematics offer the opportunity for new revenue.

Dearborn, Mich.-based Ford, the world's No. 2 automaker, plans to equip more than 1 million vehicles with Wingcast services by 2002 and outfit the rest of its models by 2004. But the lead in the telematic race belongs to General Motors Corp., the world's No. 1 automaker.

Option or Standard?

Detroit-based GM launched its OnStar telematic service as an option on Cadillacs four years ago. OnStar now boasts more than 270,000 subscribers.

Hiro Mori, an analyst at Automotive Consulting Group Inc. in Ann Arbor, Mich., said the top automakers hope to derive new income streams from telematic services, but profits have yet to materialize for GM.

"GM has been building up its subscriptions, but it has been giving OnStar access away as a promotion," said Mori. "Eventually, telematics will be just another standard option on a vehicle." ■

Continued from page 1

NT Certification

Lanop Corp., a New York-based computer systems training firm, announced that it intends to begin issuing independent NT certifications when Microsoft pulls the plug. Lanop said it's filling a void for companies that aren't migrating anytime soon to Windows 2000, and for MCSEs who see earning a Win 2k certificate as premature.

"It looks to me like that's a bit of a waste to become [a Windows 2000-trained] MCSE," said Roger Taylor, chief engineer at Radio Lubbock, a broadcast radio group in Lubbock, Texas. "I strongly think we'll wait until 2002 or whenever the next release comes out" before migrating away from NT, Taylor said. "We'll want NT people even if Microsoft doesn't."

Augustine Danquah, a technical analyst at Fairfax, Va.-based BTRC Technology Research Corp., said his company has no plans to switch its NT-based Web-hosting machines to Windows 2000.

"In my opinion, it's rash for Microsoft to force this change," he said. "We are happy with

NT, and that's what I hear from a majority of our clients."

Other technicians bordered on exasperation.

"I feel kind of jilted," said Michael Buckingham, a network engineer at Philadelphia-based technology outsourcer CDI Corp.

Buckingham paid \$6,000 for NT certification courses and now must pay another \$3,000 if he wants his MCSE certification to be valid past Dec. 31.

Buckingham said he doesn't want to find himself in the same situation with Windows 2000 certification in another year or two, so he is considering seeking a Cisco Systems Inc. certification instead.

Rod Robbins, an MCSE in Fort Lauderdale, Fla., also said he plans to seek alternate certification.

"I don't like being bullied, and it's clear Microsoft is doing this so that the technicians go to their employers and say, 'We've got this training; why not let us use it?'" Robbins said.

Dan Kusnetzky, an analyst at International Data Corp. (IDC) in Framingham, Mass., said Microsoft relies on its MCSEs to act as "in-house salespeople," pushing employers to adopt the latest Microsoft offerings.

"It will slow the adoption process if people aren't pre-

pared, and it's in [Microsoft's] best interest to speed the adoption process," he said.

Yet IDC surveys indicate that companies plan a slow migration to Windows 2000, and Kusnetzky argued that coercing engineers to recertify could cause a backlash, alienating the very in-house advocates upon which Microsoft has relied in the past.

In any event, Lanop founder John Goodfriend said he sees an opportunity.

"Companies tell us they aren't going to move," Goodfriend said. "In the past, Microsoft was able to force their mi-

grations, but they've lost a lot of their clout because of the Justice Department's [antitrust] decision."

In a statement last week, Microsoft said it doesn't know enough about the independent testing by Lanop to comment on its value. And the company staunchly defended its shift to Windows 2000 certification.

"With the introduction of the MCSE track for Windows 2000, Microsoft is helping companies identify skilled individuals who can facilitate the transition to state-of-the-art technology," Microsoft said in the statement. ■

Keeping NT Alive

Lanop Corp. in New York announced that it will fill the void left by Microsoft's decision to pull the plug on Windows NT certification with its own program.

What is it?

An independent professional program based on the current Microsoft NT certification process and covering material contained in existing simulated tests, workbooks and study guides.

When will it be available?

Jan. 1, 2001

What will the test cover?

There will be four tests covering network basics, NT Workstation, NT Server and NT Enterprise. The tests will be administered by Prometric and Virtual University Enterprises.

How much will it cost?

Each test costs \$100. Course costs range from \$3,000 for those with NT proficiency to \$20,000 for those with little or no technical background.

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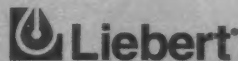
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What is Windows 2000 Advantage?

Windows 2000 Advantage is the partnership among Microsoft, Compaq and Computerworld Enterprise Business Solutions to inform IT leaders about Windows NT and Windows 2000 technology by providing timely, useful information — in print and online — for planning and deploying Windows NT and Windows 2000 with Compaq services and solutions.

Online This Week

Training Key to Windows 2000 Installations

Now that Windows 2000 installations are underway, it's becoming more clear as to what's involved: months of planning, some challenges with directory and server configuration and the need to train users in new terminology.

Dot-Com Users Cashing in on Windows 2000

David Knight, CTO for Click2send.com, started out assuming that his company would build its Web server infrastructure on Sun Microsystems Solaris and Oracle's Oracle 8. Instead, the Internet file delivery service provider ended up going with a multi-tier, load-balanced Web platform based on Microsoft's Windows NT, and more recently, Windows 2000.

Windows 2000 and Exchange on ProLiant Servers Achieve Record Benchmark

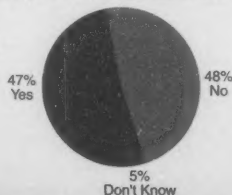
In a recent test of Microsoft Exchange 5.5 and Microsoft Windows 2000 running on Compaq's new ProLiant DL580, Compaq set a new mail processing speed record. The system achieved a record MAPI Messaging Benchmark (MMB) of 32,500 messages sent with a 158-millisecond response time.

Quickpoll Will you take advantage of the portability features offered in Windows 2000?

Cast your vote now at

www.Windows2000Advantage.com

Check out the current results:
Base: 284 ▶



Microsoft

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Windows 2000

Compaq and Microsoft Prepping for 64-bit Windows 2000 Systems

By Paul Desmond

Windows 2000-based Compaq servers that work with Intel's 64-bit Itanium processors will hit the streets later this year. It's a welcome development for users hitting performance bottlenecks on their current servers.

Not everyone will need the added boost that 64-bit computing technology promises, but it will be a boon for users who need to support large databases, enterprise resource planning applications, e-business and other applications that require heavy transaction processing.

64-bit computing offers a performance boost over 32-bit systems because of its greater processing bandwidth and ability to address a vast amount of memory. Processing bandwidth effects processor throughput and speed, which is measured by the clock cycle of a processor in MHz; processor bandwidth is measured by the width of the data path to the processor. A 64-bit path is twice as wide as a 32-bit path.

Michael Stephenson, lead product manager for Enterprise Servers at Microsoft, confirms the biggest difference between the 32-bit and 64-bit versions of Windows 2000 is compilers.

"The features are identical in both versions," Stephenson says. He compares the change to Microsoft shipping different versions of Windows NT for the Intel x86 architecture and the Compaq (then Digital) Alpha chip, saying, "It was the same code base. All you had

to do was use a different compiler depending on which platform you wanted to run the OS."

In general, customers who are pushing the envelope of 8-processor, 32-bit servers with 4GB of memory should start examining a 64-bit upgrade. "Or if someone's deploying a large enterprise

application and expect capacity to grow beyond what 32-bit architectures are providing today, then they would also want to look at 64-bit," says Stephenson.

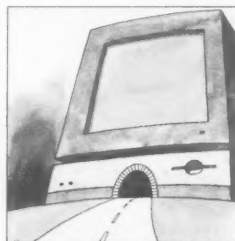
It will take a while before customers can take advantage of 64-bit computing. Com-

paq will have 64-bit servers out in the fourth quarter, says Tim Golden, director of Enterprise Server Product Marketing at Compaq. This coincides with the release of Itanium chips from Intel. Microsoft expects to have a 64-bit version of Windows 2000 out in the same timeframe.

"IA-64 is really going to take the Wintel architecture to the next step," says Gordon Haff, research director for Intel architectures at Aberdeen Group, a research firm in Boston. "Over time Windows will have a more powerful and a more scalable architecture to be hosted on than it has in the past," says Haff.

Compaq has been a leader in selling Intel-based systems from the beginning, especially in high-end computers, Haff says. "It has been among the most successful vendors in selling eight-processor Intel systems." ■

For the full text, visit www.Windows2000Advantage.com.



ADVANTAGE

► Feature

64-bit Windows Portends Enhanced Enterprise Computing

By Robert Williams

Detractors of Windows 2000 have pointed to its lack of a 64-bit environment. They claim truly scalable, enterprise level applications require the added processing boost of 64-bit computing. This criticism is losing credibility with the impending release of 64-bit Windows.

64-bit Windows is designed to run on Intel 64-bit chip platform. Itanium is the first product in Intel's IA-64 family of processors, formerly code-named Merced.

"The amazing results delivered by Intel's design team along with our 64-bit Windows operating system will provide enterprise customers with the capabilities they need for scalable, high performance business computing solutions in an increasingly Internet-based world," says Jim Allchin, senior vice president of Microsoft's Platforms Group. "Microsoft and Intel will continue to work together and with the industry to ensure the combination of Microsoft's 64-bit Windows and Intel's IA-64 processor family meets the demanding needs of customers."

The market demand for 64-bit environments is potentially explosive, especially in the e-business arena. Intel's internal research suggests only 5% of the existing Internet infrastructure can address the predicted server needs by 2005. Windows 2000 64-bit is poised to process huge amounts of data while controlling peak workloads and transactions.

Microsoft seeks to deliver this capacity while managing security, responsiveness, availability and reliability.

Microsoft has maintained API-level compatibility between the new Win64 API and the current Win32 API. This means that programs designed for 64-bit environments can take advantage of 32-bit compatibility. A single source code can be used as the basis for applications running in both environments. In

model merely extends the 32-bit environment with new data types and pointers. Let's take a closer look at development level features:

Environmental Issues — The Windows 64-based environment is nearly identical to the environment for Windows 32-based applications. Developers can compile a single source base and then execute the application on either Windows 32 or Windows 64 systems.

Comparison of Architectural Components

Component	64-bit Windows 2000	32-bit Windows 2000
Hyperspace	8GB	4MB
Non-paged pool	128GB	256MB
Paged pool	128GB	470MB
Paging file size	512TB	16TB
System cache	1TB	1GB
System PTE	128GB	660MB
Virtual Memory	16TB	4GB

addition, existing 32-bit applications should also execute within Windows 2000 64-bit platforms. In order to take full advantage of the 64-bit environment, however, existing applications will need to be ported to address new data types and pointers.

When developing or porting applications, developers are confronted with defining differences between environments and writing a seemingly endless set of extra environmental statements. The design objective of 64-bit Windows was to reduce this cycle by first supporting the full 32-bit feature set.

The 64-bit development

New Data Types — Three classes of data types are supported on 64-bit Windows.

64-bit and 32-bit Processes — 32-bit and 64-bit dynamic link libraries are utilized exclusively by the respective environment.

There are other considerations that will go into the development or porting of 64-bit windows. Microsoft provides a toolkit available on its web site. Developers should download this kit and follow the set of instructions and suggestions. ►

For the full text, visit www.Windows2000Advantage.com.

The Web Magazine for IT Leaders

Implementing Windows NT and Windows 2000 with Compaq Services and Solutions

Point of View

Compaq-Microsoft Relationship Driving Windows 2000 Success

By Mary Ryan Garcia

One of the key factors behind the strong debut of Windows 2000 is the Compaq-Microsoft Frontline Partnership. Compaq was the primary supplier of platforms upon which the Windows 2000 operating system was developed.

"The Windows 2000 Frontline Partnership is actually one of the longest standing coalitions in the industry," says Urs Renggli, Compaq's manager, Microsoft Software Marketing. Some benefits of the Frontline Partnership are lower total cost of ownership of the joint platform based on price/performance, plus reliability, availability and manageability.

Microsoft's Bruce Olson, account manager, high-end servers for Compaq, says customers want the reassurance of knowing the two companies are working hand-in-hand to bring Windows 2000-based solutions to market.

Key to the Windows 2000 Frontline Partnership is that Windows 2000 was developed on Compaq platforms. "This means as our customers go to deploy Windows 2000, it is going to work extremely well, have the highest degree of com-

patibility, and operability with the ProLiant, Deskpro, iPAQ and Armada platforms," says Renggli.

But the Windows 2000 Frontline Partnership faces challenges. "I think the biggest challenge is getting people to move out of evaluation and into deployment," says Renggli.

"We are working to jointly improve our service delivery capability," adds Olson. "We are sharing technology ideas on how to build the best tuning and optimizing for our joint platforms. Information learned from programs like Windows 2000 Datacenter will be shared throughout the Microsoft family."

In addition to Windows 2000 Datacenter, future innovations for the Windows 2000 Frontline Partnership include the 64-bit version of Windows 2000 and the next generation of Windows 2000. "Compaq continues to work hand-in-hand with Microsoft's engineering and marketing teams to ensure the highest reliability and performance of these new operating environments on Compaq hardware," Renggli notes.

For the full text, visit www.Windows2000Advantage.com.

For more inside, hands-on Windows 2000 information, go to www.Windows2000Advantage.com



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MBA Programs Expand E-Commerce Course Offerings

Recent dot-com failures may have diluted Wall Street's enthusiasm for new Internet ventures, but it hasn't quenched the thirst of information technology executives for e-commerce training.

The demand drove leading business schools to expand the

e-commerce courses within their executive education programs for the upcoming school year.

But the executives signing up are no longer the novices they once were, and they're demanding more sophisticated e-commerce course work.

"People who come to the [e-commerce] course have a better base of knowledge about how the Internet works," said John Lankford, director of executive education at Carnegie Mellon University in Pittsburgh.

"The field is becoming bet-

ter defined, and people are asking us for more," Lankford said.

Northwestern University's Kellogg Graduate School of Management in Evanston, Ill., added two new e-commerce courses because it couldn't keep up with student demand.

The university's e-commerce class kept selling out, and anxious IT executives were put on the waiting list, according to Kathryn Bauer, director of marketing for Kellogg's executive programs.

Here are some of the other new electronic-business courses executive MBA programs are offering this fall and next spring.

—Julekha Dash

SCHOOL	NEW E-COMMERCE PROGRAM *	COST	WHEN OFFERED
Stanford University	Silicon Valley E-Commerce Executive Program Presents case studies and research developed within Stanford's Center for Electronic Business and Commerce. Includes analysis of business models and applications presented by faculty as well as Silicon Valley e-commerce experts.	\$4,900	Oct. 10-13, 2000
Northwestern University/ Kellogg Graduate School of Management	Customer Relationship Management in the Network Economy	\$3,200	Sept. 17-20, 2000
	Course on developing technologies and strategies for implementing Internet-based customer relationship management systems and how to address security and privacy concerns.	\$3,800	Feb. 25-28, 2001
		\$3,800	June 6-9, 2001
		\$3,800	Sept. 26-29, 2001
University of Pennsylvania/ The Wharton School	Sustainable Competitive Advantage in the Network Economy	\$3,200	Dec. 3-6, 2000
	Provides an overview of the difference between traditional and New Economy business models and strategy.	\$3,800	April 1-4, 2001
		\$3,800	Nov. 14-27, 2001
	Fellows in E-Business Program (includes two phases) Three and a half weeks of classroom instruction held in four different locations: Philadelphia, Silicon Valley, Israel and Europe. Students apply material from the classroom in their own companies and learn how to operate an online business or transform companies into electronic-business leaders.	\$49,000	Nov. 27-Dec. 2, 2000 (Philadelphia) Jan. 8-12, 2001 (Silicon Valley) Feb. 18-24, 2001 (Israel and Brussels) March 14-16, 2001 (Philadelphia)
Carnegie Mellon University/ Graduate School of Industrial Administration	Advanced E-Commerce Technologies	\$3,950	Jan. 6-8, 2001
	Covers emerging technologies for security, wireless, intelligent agents and human/computer interaction.		March 28-30, 2001
	E-Marketing Success Drivers	\$3,950	March 5-8, 2001
	Covers electronic-marketing strategy, leveraging personalization and e-commerce technologies.		Nov. 12-14, 2001
University of California at Berkeley/Haas School of Business	E-Business Management Program	\$15,000 (\$5,000 per course)	One: April 9-13, 2001
	Modular program with three separate courses:		Two: May 14-18, 2001
	Week 1 covers leadership in the new economy; Week 2 covers financing and evaluating e-businesses; and Week 3 is about e-commerce strategies.		Three: June 18-22, 2001
	E-Technology Program: Will be launched in conjunction with the School of Information Management and Systems. Offers electronic-business project managers techniques to understand the technology behind e-commerce.	To be decided	Sometime next year
Columbia University	E-B2B: Winning in the Digital Economy	\$3,750	Aug. 14-16, 2000
	Students learn about the cost savings and efficiencies achieved from becoming digital, as well as successful business models.		Dec. 17-19, 2000
	E-Valuation: Maximizing the Value of Internet Ventures	\$2,500	Oct. 25-26, 2000
	Helps students formulate Internet financial strategies and evaluate Internet businesses.		
University of Michigan	E-Law: Legal Issues Surrounding the Internet	\$2,500	Jan. 11-12, 2001
	Covers the risks associated with online businesses and how to protect intellectual property.		Aug. 16-17, 2001
University of Michigan	E-Commerce Law for Managers	\$2,400	Nov. 16-17, 2000
	Presents risks associated with doing business online and how to protect intellectual property with copyrights and patents.		April 26-27, 2001

* Note: These are new classes that will be offered in conjunction with existing programs.



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BRIEFS

Microsoft Uses Tool to Sniff Out Online Pirates

In the past two months, Microsoft Corp. has ordered 7,500 Web sites and Internet auctions to stop selling counterfeit Microsoft software. The company sent notices to another 600 Web sites last week. The software giant's secret weapon in combating piracy: an Internet monitoring tool that, according to Microsoft, sniffs out Net fraud 24 hours a day, seven days a week. The vendor is leasing the tool, an intelligent Web crawler, from the software's developer, a third-party vendor that Microsoft didn't identify. The company has been using the tool since November to detect counterfeit versions of its Windows 2000 operating system.

BroadVision Prepares for Wireless E-Business Future

Looking for a piece of the action in the red-hot wireless market, BroadVision Inc. over the next few months will add wireless capabilities to some of its electronic-business software, allowing businesses to distribute information and services to a range of mobile devices, a company executive said last week. The Redwood City, Calif.-based company develops software that allows businesses to offer commerce, billing, banking and other services to customers over the Web. BroadVision will add wireless capabilities to those applications, enabling companies and their employees to access information from devices such as mobile phones and handheld computers.

Nortel Pays Big Bucks For Big Web Switch Maker

\$7.8B stock deal gives it Cisco competitor Alteon

BY JAMES COPE

DEMONSTRATING THE high-stakes nature of gaining a presence in the high-end content and application Web switching market, Nortel Networks Corp. has announced an agreement to purchase Alteon Web-Systems Inc. for \$7.8 billion in Nortel common stock.

Alteon's Web switches, which range in price from \$10,000 to \$40,000, compete with similar products from San Jose-based Cisco Systems Inc.

Cisco acquired its line of Web switches with the purchase in June of Acton, Mass.-based ArrowPoint Communications Inc. for \$5.7 billion.

Web switches decrease delays in

Web site response (latency) by distributing user requests for information — a video clip, for example — over several servers that host the same content. The devices also increase infrastructure reliability by detecting server failures and directing traffic to backup servers at the same site or to other servers at geographically dispersed data centers.

According to Ron Westfall, an analyst at Current Analysis Inc. in Sterling, Va., Web switches read data packets to determine the type of content requested and then "snap traffic to the right server on the fly."

Westfall said growth among Internet content-hosting companies and application service providers (ASP) will be a major driver for the Web switch busi-

ness over the next three years. His firm projects that the ASP market will grow from \$2 billion this year to \$15 billion by 2003.

Analyst Jim Slaby at Giga Information Group Inc. in Cambridge, Mass., said it's been well known for a couple of years that San Jose-based Alteon was available for acquisition. The \$7.8 billion that Brampton, Ontario-based Nortel agreed to pay for the company most likely would have been considerably less, Slaby said, had Nortel made its move six months earlier. Nortel announced the agreement with Alteon on July 28.

In a separate development last week, Nortel officials said the company had signed a \$300 million contract with ClearData Communications Inc. in Phoenix for data center equipment and systems integration services. ▀

Oracle Embraces ASPs as Hosts

BY MEGHAN HOLOHAN AND MARK HALL

Oracle applications are now available through application service providers (ASP), and by all accounts, Larry Ellison is still breathing.

Oracle Corp.'s chairman and CEO had once said that ASPs would be able to offer his firm's business software suite only "over my dead body" be-

cause he wanted to force Web-based users through Oracle's own Business OnLine hosting service. That promise notwithstanding, the company last week said it had approved nine ASPs to host its applications.

The company currently permits the ASPs to license the Oracle 8i database and to sell subscriptions to users. However, Oracle executive Jeremy Burton

Change of Heart

Oracle last week said it had given its approval for the following ASPs to host its applications:

- Agilera.com Inc.
- BlueMeteor Inc.
- Center 7 Inc.
- GlobalCenter Inc.
- Hostcentric Inc.
- Interliant Inc.
- Nupremis Inc.
- Sallie Mae Solutions
- Winstar Communications Inc.

said ASPs won't be permitted to act as resellers of the application suite because the products still will be sold as licensed software through the company's direct sales force. The nine — and potentially more — ASPs will host the software for users.

Phil Wainwright, a London-based analyst at Darien, Conn.-based Internet.com Corp., said, "This is a gradual change from a market perspective, but a big change to Oracle's business model." Ellison obviously had a change of heart, he added.

And the change won't stop there, said Wainwright. "Ultimately, Oracle will be forced to adopt a licensing model based on use of an application," not the server it runs on, he said.

Burton didn't disagree.

"We may get to a point in time where ASPs own the software license and meter it out," he said. ▀

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
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Skittish Users Say Hype About SANs is 'Baloney'

Expense, technical uncertainty and lack of standards are giving IT managers pause

BY KATHLEEN OHLSON
AND SAMI LAIS

THE PROMISE OF storage-area networks (SAN) is great. What information technology department wouldn't want a dedicated, high-speed network for a shared pool of storage devices? It offers centralized management and the scalability to handle terabyte databases. Plus, it off-loads backup traffic from the LAN.

The industry hype about SANs has been great, too. Vendors have spewed out at least 1,460 press releases about SANs in the past 18 months — surpassing even the “wireless Web” on the hype meter (with 1,056 releases) during the same period.

But some corporate IT managers don't buy it. They look at SANs and see a risky, immature, expensive technology with interoperability prob-

lems, according to three studies and interviews conducted with a dozen users.

Buyers may sympathize with the IT manager who complained that “there's so much smoke and baloney around SANs, it's impossible to know what's real.”

Compatibility Problems Remain

In a recent survey of 100 storage-savvy IT professionals, Enterprise Management Associates Inc. (EMA) in Boulder, Colo., found that 80% had a major gripe about SANs that is holding back their purchase or deployment of the technology (see chart).

So while users are eager to gain the benefits of SANs, “the act of implementing the technology at this stage is daunting enough to give IT professionals serious pause,” the EMA study said.

“Daunting” is an understatement for Shawn Tu, a systems administrator at Assurant Group, a credit-related insurance company in Atlanta. After hiring a systems integrator, investing months of work and spending hundreds of thousands of dollars to build a SAN, he flipped the switch — and it failed.

The SAN's Fibre Channel switches and Solaris servers just didn't work together, Tu said. Numerous interoperability glitches required custom fixes. As the frustrated Tu put it, “The customer site shouldn't be the interoperability [test] site.”

Tu isn't alone. In a recent *Computerworld* survey of IT managers, 49 of the 160 respondents cited interoperability as their biggest concern about SAN implementations.

All in all, Assurant paid \$250,000 for its initial 1 terabyte (TB) SAN and finally got it working after almost

two months, “but I could not quantify how much of my sanity was lost in dollar terms,” Tu said.

Lack of interoperability isn't a new problem for SANs, but it's a lingering one.

“The SAN interoperability issue is a double-edged sword [for vendors],” said Steve Duplessie, an analyst at Enterprise Storage Group Inc. in Milford, Mass. “They all agree they need to propel the interoperability issue forward.” But with their allegiances divided between two prestandards bodies — the Storage Networking Industry Association (SNIA) and the EMC Corp.-led Fibre Alliance — the vendors may never agree on standards proposals, he said.

The finger-pointing is intense. An IBM official, for example, said EMC isn't interested in standards because it's the market leader. Hopkinton, Mass.-based EMC said that's untrue and that it's the server vendors that have suppressed standard development.

It's possible that users could goad vendors into cooperating. And there are glimmers of hope. In what one analyst called “a bloodless coup,” the industry adopted protocols developed by San Jose-based Brocade Communications Systems Inc. to ensure that different Fibre Channel switches can talk to each other.

Work in Progress

The industry is keenly aware of the interoperability problem and says it's working on it.

For example, EMC offers storage networking for 35 server environments, including mainframes and open-system servers, said Don Swatik, EMC's vice president of strategic planning. And the Fibre Alliance has proposed a specification for managing devices across a heterogeneous network, he said.

Speeding release of SAN standards is the primary goal of the SNIA, said Gary Phillips,

the consortium's board secretary and systems technology manager at Compaq Computer Corp. SNIA members are developing definitions for a range of standards to submit to a standards body, Phillips said.

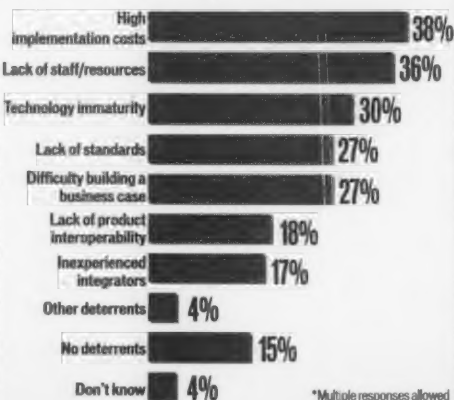
Furthermore, many vendors — including EMC, IBM, Hitachi Data Systems in Santa Clara, Calif., and EMC spin-off McData Corp. in Broomfield, Colo. — have built interoperability labs to test their products with those of other vendors. EMC said it has spent more than \$1 billion on interoperability testing during the past six years.

But these labs don't go far enough, Tu said. “They test

SHAWN TU, a systems administrator at Assurant Group, says, “Make sure your system integrator knows all the products you want to work with and has a lot of patience. There are no blueprints for a SAN”

What's Holding Back SANs?

A survey of 100 storage-savvy IT professionals identified the following deterrents to SAN deployments*:



*Multiple responses allowed

[for interoperability of] each other's hardware, but they don't do very well testing software on different operating systems," he said. "Ours worked almost flawlessly on NT but had lots of problems on Unix."

In a study conducted by International Data Corp. (IDC) in Framingham, Mass., more than 80% of 301 IT professionals rated "open standards" for SANs as very important.

Underlying user concern is that in the absence of standards, the simplest way to build a SAN is to get everything from a single vendor. But then the user is locked into one vendor and its technology choices, which could become obsolete.

"The reality is that SANs are risky, with lots of gotchas," said Matt Rock, director of engineering services at systems integrator Intelligent Solutions Inc. in Medford, Mass. "It's a valid fear" that a single-vendor SAN could be superseded by new standards, he said, and

then the user would have to rip it out and replace it.

Although users complain of immature or nonexistent SAN standards, some analysts call it a nonissue. "Considering how new SANs are, I think the standards are maturing fairly quickly," said William Hurley, an analyst at The Yankee Group in Boston. "It's just that the need — the insatiable consumption of spindles within the enterprise — is growing faster," he said.

"It's a red herring," said John Webster, an analyst at Illuminata Inc. in Nashua, N.H. "SANs are about cost vs. benefit."

The High Cost of SANs

Ah, but those costs. An extensive, enterprise-level SAN could cost \$4 million or more.

Richard Boyle, vice president of technology deployment at The Chase Manhattan Corp.'s global private banking unit in New York, got quotes ranging from \$210,000 to EMC's bid of \$1.2 million for a 3TB to 10TB SAN. "If I went to

my boss and quoted him \$1.2 million for a SAN, he would throw me out of his office and then open the door," Boyle said. "I asked for \$210,000, and the CIO still questions why the amount is so high."

SANs are more expensive if they require an enterprise subsystem, such as EMC's Symmetrix, IBM's Shark or Hewlett-Packard Co.'s HP 256. "You can cut your total costs by as much as half by using distributed storage" such as Compaq's MA 8000, said Ron Johnson, an analyst at Evaluator Group Inc. in Englewood, Colo.

That's true, said Jill Kaplin, IBM's director of SAN marketing strategy. "If you're not doing tens of terabytes of storage, a big subsystem like the Shark may not be the most efficient way to go," she said. But as storage approaches IOTB, economies of scale and performance come into play, she said. "If you've got an environment with a big Oracle or DB2 database or SAP application, you're going to need the performance" an enterprise subsystem provides, she said.

Rich Ward, associate vice president of support at Keystone Mercy Health Plan in Philadelphia, said he's concerned about costs. He's planning a pilot SAN for the health plan's Medicaid division, but the price tag may hit \$200,000 to \$400,000.

He's also worried about taking the SAN plunge too soon. If he deploys a SAN now, there's a danger that "a year from now we'll have to rip it out in order to add functionality," he said, "or we buy it, put it in and it becomes obsolete."

Shifting Technologies

One of the nagging worries about SANs is that there isn't complete agreement on exactly what technologies to use.

The prevailing view is that Fibre Channel is the data transport protocol of choice. But some vendors advocate other protocols such as Enterprise Systems Connection, SCSI over IP or InfiniBand, an I/O architecture being developed by the Infiniband Trade Association in Portland, Ore. And one company runs a SAN over High Performance Parallel Interface, which is commonly used for supercomputers.

For large companies, the problem with Fibre Channel is

that the distance between connected devices is limited to a range of 30 meters to 10 kilometers, depending on the connector type and wavelength.

At Chase Manhattan, Boyle said, the bank has as many as 10 SANs (depending on the SAN definition used), but they're in different buildings and no SAN island connects to another. The lack of support for wide-area networks in the SAN technology means there's no effective way to connect them, he said.

Despite the problems, there are SAN success stories, where SANs have made it easier to manage the burgeoning growth of data from enterprise applications and data warehouses. With administrative costs for storage rising 100% to 300% annually, companies will be forced to consolidate storage to get costs under control, analysts said.

Backup of that data is the "killer app for SANs," said IDC analyst John McArthur. "LAN-free backup isn't the kind of thing that gets CEOs excited, but it makes data center managers' lives easier," he said.

Ultimately, Boyle said, he believes Chase Manhattan's SAN investment will pay off. The 30 servers in his department have been consolidated into four, and he expects the SAN to save about \$340,000 annually — not including labor-cost savings. "It's worth every buck that was invested," Boyle said.

Nevertheless, a healthy dose of skepticism is prudent, said one IT manager who plans a pilot SAN this year. "It'll be like having a [navigation system] in my car," he said. "It's really cool, but I just don't need it."

At McKessonHBOC Inc., a San Francisco-based drug distributor and medical software vendor, technologist Stephen Zander also said he has no illusions about his planned SAN pilot. "It's not a magic bullet," he said. "There's a lot of talk, and to take it at face value is not wise. It's maturing technology."

Tu added this cautionary note: "Make sure your system integrator knows all the products you want to work with and has a lot of patience. There are no blueprints for a SAN." ■

So What Exactly Is a SAN?

As if storage-area network (SAN) technology weren't complex enough, it's impossible to find even two networking cognoscenti who agree on what a SAN is.

A SAN can be as bare-bones as a server connected via copper to a LAN having a dedicated backup connection, one industry analyst said.

Another scoffed at that, saying direct-attached storage not only isn't a SAN, but it's a technology on a short path to extinction.

For other analysts, it's not a SAN unless it runs on Fibre Channel and has fail-over and virtual storage capabilities.

Confused? Forget the technology and start with the basic concept, said Stanley Worth, a product manager at Fibre Channel switch maker Crossroads Systems Inc. in Austin, Texas.

A SAN is about time and space, he said. "Time is what keeps everything from happening all at once. Space is what keeps it all from happening in the same place."

"Networking allows the spreading of data across space, and storage lets you move the data across time," Worth said.

In other words, a SAN is the confluence of storage networking and data resources around space and time, he said.

The Storage Network Industry Association in Mountain View, Calif., defines a SAN as "a network whose primary purpose is the transfer of data between computer systems and storage elements, and among storage elements."

But "the definition will be different for every SAN," just as it's different for every network, said Jerry Lynch, operations director at the Online Computer Library Center in Dublin, Ohio. Lynch oversees all backup to a SAN.

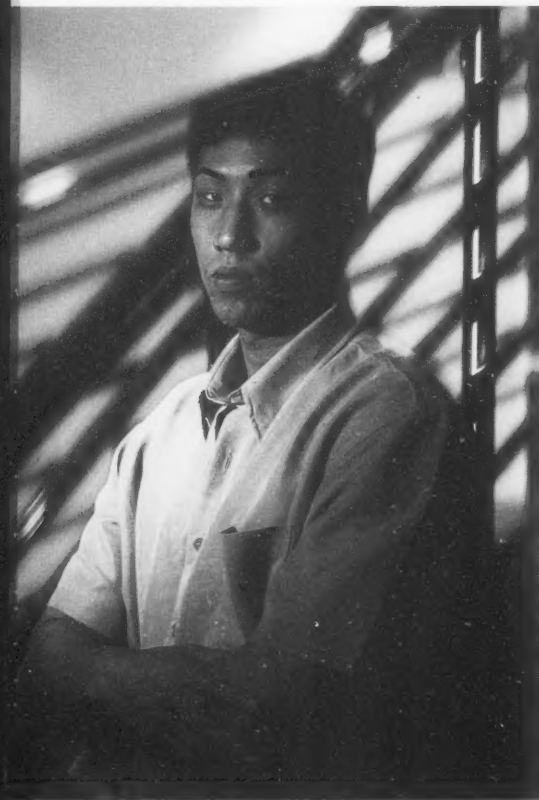
"For me, it's sharing new tape drives across multiple platforms and across Fibre Channel switches, not redundant hardware for each platform," he said.

"It's not a crisp definition, nor should it be," Lynch said. SAN technology "is still new and still evolving."

— Sami Lais and
Kathleen Ohlson

MORE THIS ISSUE

For more about IT managers making strategic storage decisions involving SANs and networked-attached storage, see page 70.



MARYFRAN JOHNSON

Pandora's pirates

LIVING AS I DO with two teen-agers who are as fond of MP3s as they are of their computers, the Napster controversy has been hard to ignore at my house. Not that I haven't tried.

But my home network limps painfully when one of my girls is downloading music files, making it more agonizing than usual to read my e-mail. The other daughter has actually been banned from Napster, along with 300,000 other hapless online music

swappers identified by Dr. Dre and Metallica as copyright violators. Naturally, she thinks the bad guys are the rich rappers and rockers, not the Web site facilitating her minor-league music piracy. Some 20 million irate Napster fans no doubt agree.

So I feel very much in the minority — and disloyal to my own offspring — in hoping that the record industry ultimately wins this one and drives a stake through the heart of Napster's business model. Napster and other like-minded sites make it possible — and highly appealing — for millions to conveniently overlook copyright laws and suffer zero to minor consequences.

This wildly popular dot-com has wrenched open a Pandora's box of legal gray areas, content ownership issues and online piracy debates. It's also cast a harsh light on what looks to be the inevitable clash of cultures between Internet businesses and traditional ones. The fact that the Net can commoditize anything that can be digitally encoded is understandably



MARYFRAN JOHNSON is editor in chief of *Computerworld*. You can contact her at maryfran.johnson@computerworld.com.

alarming to content producers across several industries, including my own. Traditional businesses like to believe that all the same laws apply in cyberspace, but the dot-coms keep forgetting to respect the rules.

I suspect that most IT people are also of a divided mind about Napster. You know that this file-sharing technology poses a security risk to your networks and can jam up your bandwidth. You also know it can put your company legally at risk if employees use workplace PCs to break the law. Yet the technology itself is

compelling and clearly unstoppable now, enabling something so appealing that tens of millions crave it.

But remember this: All of our Web sites rely on content of some kind. Those assets are as real to our businesses as the racks of CDs the music industry wants to keep selling. I know I want to protect my site's content from, say, Contentville.com, which conveniently overlooked our copyright recently. I suspect you want to do the same. ■

ALEX TORRALBAS

Napster case a wake-up call for record labels

THERE'S NO TELLING how the Napster saga will turn out, now that the fate of the online music pipeline is in the hands of the courts.

The issue comes down to this: Napster says it's a vehicle that facilitates the desire of millions of people to share their favorite songs or albums over the Internet, much as they did by making tapes and telling their friends, "Hey, check this out!"

The Recording Industry Association of America, the record labels' lobbying group, sees it as outright piracy and a flagrant disregard of copyright law. I see it as technology tipping over the apple cart, with the lawyers again winning and everyone else either losing or being derailed.

The record industry's business model is pure Industrial Age: manufacturing and shipping pieces of plastic. The fact that the plastic contains music is entirely incidental. They don't call it product for nothing, nor is the industry term *shifting units* exactly art-related.

The industry's profit model is based on the fact that the pieces of plastic cost the labels about \$1 each to manufacture, and you pay \$17.98 or more to buy one. (Any artist short of a well-known act rarely sees a penny aside from any advances, which add no more than another dollar to the costs.)

MP3 and other forms of digital music threaten this profit model. Never mind that the technology has existed for years and is even more advanced and cheaper today, making it possible for labels to eliminate the plastic and its associated costs and distribute music virtually for free. How, they ask, can we make money from that?

Rather than face this challenge, labels have unleashed their legal hounds to crush MP3. They've done this before: In the 1980s, they effectively killed digital audio tape, and in the '70s, albums and tapes bore skull-and-crossbones stickers warning buyers against taping the music on cassettes. And part of why recordable CDs took so long before they were available to consumers was the labels' fear that CDs, too, would cut into profits.

Well, none of these technologies killed them or starved artists any more than VCRs killed the movie business.

So, where is all this leading?

IT professionals at record labels have an oppor-



ALEX TORRALBAS, who has worked in the recording industry, is an independent IT consultant and Visual Basic developer in New York. He can be reached at alex@info-software.com.



tunity here to be real heroes. Through Napster and MP3.com, the technology has been proven. Some labels are now, belatedly, moving to sell music digitally. But it's not going to work as long as the record labels are structured the way they are. That's where record label CEOs have to get brave and get smart. IT's challenge is to demonstrate to risk-averse CEOs that they can trust the new technology, let go of old fears and show 'em the money. Can it be done? Put it this way: Web portals give away news, weather and sports for free every day. It can be done. It just takes originality and guts, not lawyers. ▀

BILL LABERIS

Why do good CIOs have to be the fall guys?

WHY DO BAD things happen to some good CIOs?

The recent firing by Global Marine of Richard Hudson (Page One, July 24) is a case in point. Hudson, the CIO for 18 years, was revered by his staff, some of whom he mentored before they became CIOs themselves. As a *Computerworld* Premier 100 award winner, Hudson was renowned even among his peers as a gutsy manager who once put the kibosh on a huge re-engineering project the day before it was to go live, much to the consternation of senior management. The decision proved correct when the new servers pulled up lame.

Hudson isn't the first great CIO to be out on his ear for no apparently good reason. Though Hudson

said his dismissal makes sense, his successor said the firing wasn't due to performance or cost cutting. Why, then? Back in 1995, a struggling Kmart booted Dave Carlson, a true CIO star and innovator, who went on to lead the IT charge at Ingram Micro. Two weeks ago, Kmart said it would shutter 72 stores. Spearheading Kmart's plan for recovery will be — get this — an



BILL LABERIS is a consultant in Holliston, Mass., and former editor in chief of *Computerworld*. Contact him at bill@laberis.com.

overhaul of IT. Five years after firing Carlson, when Kmart's biggest problems were messy stores and aging inventory, Kmart still thinks its problem is computers. What do analysts say Kmart's problems are today? Why, customer service and inventories!

Poor company performance no doubt fueled Carlson's firing, and this offers the first hint of why bad things happen to good CIOs. Meanwhile, Global saw its stock soar 62% this year in a flat market while quarterly revenue, reported last month, is up 18%.

It's not poor company performance per se, but

rather an ongoing, unrealistic sense among some senior executives of the power of information systems to drive a company to prosperity. This unrealistic belief was born in the 1980s when the concept of "information as a competitive weapon" was nurtured. It's a competitive weapon, but almost never is it the defining competitive weapon, the exception perhaps being some of the emerging dot-coms. In fact, today, with a growing emphasis on corporations leasing more of their IT infrastructure from various value-added service providers, IT may become less of a competitive weapon and more of an equalizer. Still, the belief persists in some quarters that IT somehow can overcome failings in marketing, sales or other key strategic and operational areas, and CIOs pay the price for this misguided belief.

Some CIOs may unwittingly put themselves in positions to take a hit simply by being good peo-

ple and solid citizens of their profession. Carlson, Hudson and several other CIOs who come to mind made themselves highly visible, quasi-public figures by responding to reporters' inquiries, speaking at industry events or doing a job worthy of very public awards. Is it possible that such notoriety can rub other executives the wrong way at times? I never underestimate the corporate executive ego, and maybe some of the brighter stars in the CIO galaxy ultimately fall victim to it.

Finally, good CIOs like Hudson who endear themselves to their staffs may be seen as out of step in a world where job-hopping and micro-tenures effectively disallow the formation of bonds of loyalty. Could good guys be looked upon as soft guys? Is loyalty and long-term employment looked upon by some as complacency?

Unfortunately, today, the answer to both questions is yes. ▀

READERS' LETTERS

Control of the Internet could be the end of it

ONE OF THE beautiful characteristics of the Internet is that no one controls it. It grows and flows in no certain way. Now, lawyers are going to try to control it and define it so that they can settle disputes ["ABA Cyberspace Group Calls for Global Internet Commission," *Computerworld* Online, July 12]. If they succeed, it's the beginning of the end of the Internet.

Bruce R. Schmidt
Cost engineer
Public Service Commission
Madison, Wis.

Integration disaster

IUSED TO AGREE with Michael Gartenberg ["Why a Breakup of Microsoft Is a Bad Idea," *News Opinion*, July 3], but last week I changed my mind.

Because of Microsoft's philosophy of integrating its applications tightly with the operating system, a glitch in an application can trash the entire system.

I experienced this with Visual Studio, and two days of work was lost as I tried vainly to salvage the deteriorating operating system. Final-

ly, I had to reformat and reinstall Windows NT.

There is no excuse for an application to alter the underlying operating system.

If weaning the application teams from dependence on operating system modifications requires a breakup of the company, I'm all for it.

Eric Wadsworth
Chino Valley, Ariz.
wad@acm.org

Who comes first?

WHY IS IT that every field must have equal gender and racial representation in its ranks ["Report Calls for Greater Diversity in Hiring for High-Tech Jobs," *Computerworld* Online, July 13]? It isn't about representation; it's about opportunity.

For example, Eileen Collins, the astronaut who testified before the congressional commission, had the opportunity, but she herself admits that she saved to peer pressure and took the easy path.

We should let anyone compete for any given job, but when it comes down to it, let the best-qualified skill set perform the job regardless of who owns it. How can that happen? Companies

should give fundamental tests of logic and problem-solving relevant to their business.

You can't just say IT needs more blacks, more women, fewer whites, fewer males or more Muslims. IT needs more people who are interested in performing the work that is available.

Andrew Wang
Houston

IHOPE THE industry continues to reach out to minorities and handicapped people. If we stay the course, then these people will have opportunities. The downside is that if we flood the market with H-IBs in an effort to control marketplace salaries, we lose opportunities created by the shortage of skilled, trained IT people. I, for one, am committed to helping our minorities and handicapped people first, then addressing foreign interests.

Martin Scharloo
Consultant
Middlesex, N.J.
MScharl@ncsus.nj.com

No fan of Bell Atlantic

IWISH I COULD share Russell Kay's excitement about Bell Atlantic DSL ["The DSL Experience," *Tech-*

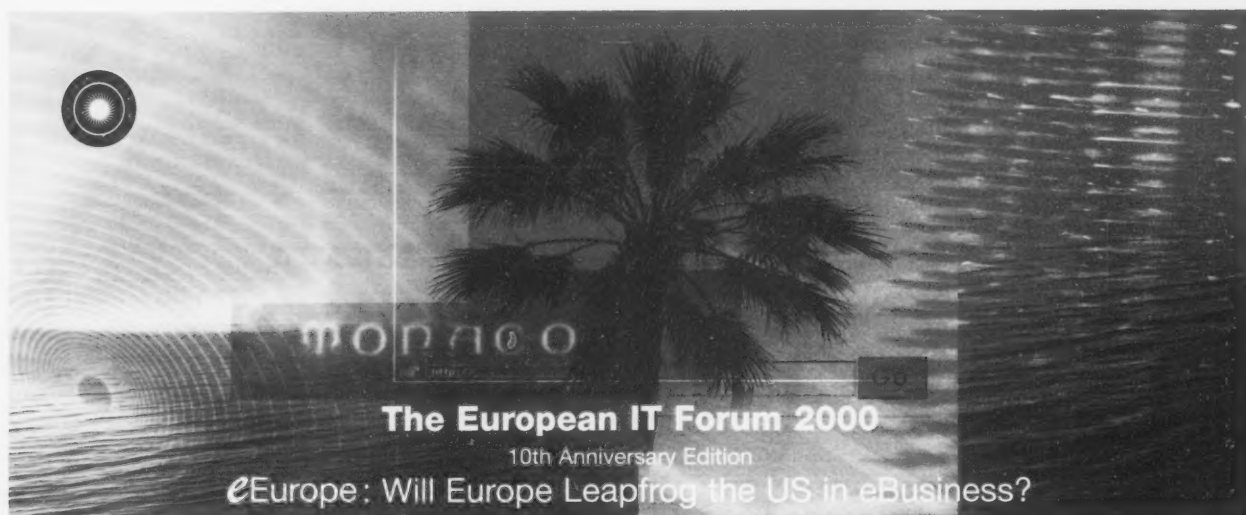
nology, July 20]. I have had the service since April. I stopped counting how many times the service was down. The download speed is about 220K bit/sec. measured with the utility mentioned in the article.

The WinPoe software was not compatible with Windows 2000 when I subscribed. The upgrade that made it Windows 2000-compatible was released in June. It crashes Internet Explorer 5.0 (5.5, too) and Outlook Express on my computer at random. Not even a blue screen of death. I spoke with Bell Atlantic technical support several times. Every time, they guided me through removing some network drivers in the control panel.

Michael Rubinstein
Programmer
Comtran Associates Inc.
Brooklyn, N.Y.
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COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, *Computerworld*, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.



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Jennifer Schenker, Chief Technology Correspondent, Time Magazine

Jan Steenkamp, CEO, Open TV

Alexander Straub, Founder and Vice Chairman, Mondus.com

Robert Thys, Director of Marketing, EURO.NM

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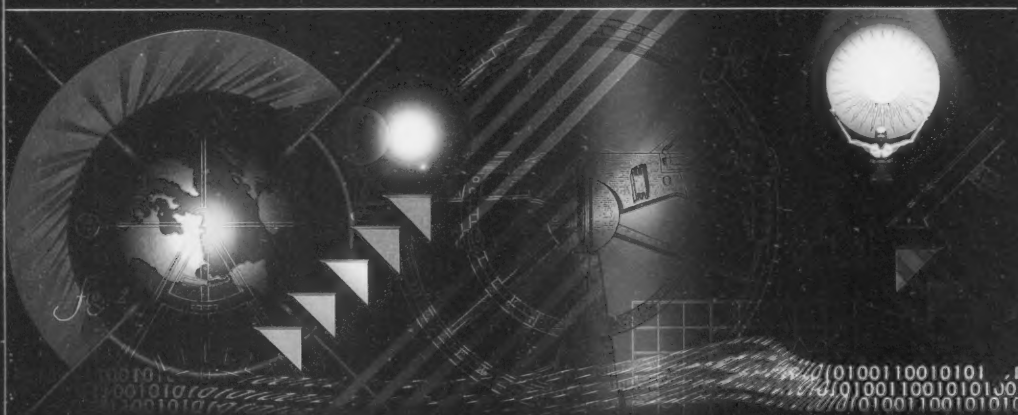
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Best Practices *in* Enterprise Management



STEVE FOOTE



Enterprise Management Paves the Way for Successful E-Business

As if managing a company's IT infrastructure was not difficult enough already, the onset of E-business practices brings a wealth of new enterprise management challenges. In an effort to increase revenues and remain competitive, many corporations have recently deployed e-business applications only to discover that their customers become quickly disenchanted with the overall level of service provided.

Unfortunately, service levels of e-business applications degrade with the exponential growth of users. The internal IT infrastructure, on which the e-business applications rely, is negatively impacted by the additional transaction load. With competitors only a click away, poor service levels will quickly lead to customer dissatisfaction and lost business.

So businesses are finding that implementing best practices in enterprise management has become critically important for managing the service levels of their e-business applications. Without sufficient enterprise management in place to detect and address these issues, a company's early success with e-business can quickly turn against it.

Virtually every company embarked upon its e-business strategy with the pri-

mary objective of increasing its overall revenues (the "top line"). The general idea was that an e-business can more effectively service its customers because it's open 24 hours a day and can be accessed from any point on the Internet. Customers no longer required direct interaction with a company's sales force in order to get product information or make purchases. And a company's increased effectiveness in reaching customers typically translates to increased revenues.

A great example of this type of e-business is Worldspan. Worldspan is one of

this year's gold award winners in the BMC Software Best Practices in Enterprise Management program. As it's responsible for more than 50% of all online travel reservations (air, car, hotel, etc.),

Worldspan quickly recognized the need to establish premium service levels for its e-business applications. The company has been so successful at managing its own IT that it has recently entered into a new business—hosting Web sites for other e-businesses. In this case, the IT department has excelled at its own function and turned what is a cost-center for most businesses into a new business opportunity. Congratulations to Worldspan for using its best practices in enterprise management to ef-

With competitors only a click away, poor service levels will quickly lead to customer dissatisfaction and lost business.

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fectively increase its revenues.

The second wave of e-business strategies has been focused on increasing an organization's efficiency by cutting costs, thereby increasing the profit margin (or "bottom line"). In response to the increased workload resulting from doing business over the Internet, many corporations have begun to decentralize the IT function. But this approach quickly leads to redundant staffing and higher costs.

In this supplement *Worldspan* and the other winners, including *Mirage Resorts, Bank of America, Burlington Northern Santa Fe* and *Pacific Gas & Electric*, show you their best practices in other areas, including hospitality, the shipping industry and the utility industry.

STEVE FOOTE, president & CEO of *Enswers.com*, works closely with his customers' executive management teams designing, building and implementing e-business strategies. Prior to co-founding *Enswers.com*, his business experience included management participation in two IPOs, two private placements, one merger and 29 acquisitions. His technical background includes developing applications, running large-scale IT management departments, managing growing software companies and analyzing high-tech markets.

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*General
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Mirage Resorts

Mirage Resorts saves millions and boosts quality by remotely monitoring computer rooms

**GOLD
AWARD
WINNER**

When Mirage Resorts, Incorporated unveiled the Bellagio hotel in Las Vegas and the Beau Rivage resort in Biloxi, Miss., it was time for a fresh approach to enterprise management. After all, another 150 hosts were being folded into the company's IT environment. The number of Mirage employees had jumped from 18,000 to 30,000. The company was supporting 106 applications, and its mix of host, client and storage devices was only growing more diverse.

Under the company's former distributed management model, these circumstances would have required hiring an additional 33 IT employees. But the \$2.6 billion leader in the hospitality and gaming industry was reluctant to add increasingly scarce and expensive IT employee resources to accommodate new properties. The handwriting was on the wall that this method of supporting its IT environment was not going to scale well, from a budget or a service-quality perspective, explains

Laura May, director of systems engineering in Mirage Resorts' information systems group.

"We wanted to run a lean shop and get the most from the people we already had," she explains. "In addition, human error had begun creating some quality issues." As the company grew, so did the service-quality challenges associated with having too many manual IT processes. The company had established service-level agreements (SLAs) with its user base but was having trouble delivering on them consistently, May says.

There were also training hurdles to overcome. IT technicians needed to understand multiple management systems from



PATROL provides us with centralized management of our computing environment.

GLENN BONNER

a potpourri of vendors, which slowed down troubleshooting and problem resolution. The company was facing the support of 13,000 networked nodes, including Windows-based terminals, PCs and cash registers. These were spread across five locations in Las Vegas, connected by a 1G bit/sec. backbone metropolitan area network and the Beau Rivage property connected by an ATM WAN link.

Taking a new tack

In 1997, Mirage Resorts began investigating centralized management alternatives. Its product evaluation criteria included multi-platform support for clients, ease of implementation, a cost-effective pricing model, top-quality vendor support and product scalability, says May. Mirage narrowed its vendor candidates down to BMC Software (then Boole & Babbage) and two others. During the review process, Boole & Babbage purchased one of the other finalists. The remaining competitor's pricing model did not scale well, says May. It also required two platforms to support the mix of Mirage Resorts' computing environments, where the Boole & Babbage COMMAND/POST® product could fill the bill with one.

The impact of the COMMAND/POST, which was renamed PATROL® Enterprise Manager, installation two years ago has been dramatic. The company now fulfills its user SLAs 91% of the time on average — up from 76% — "and we're still climbing," May notes proudly. The benefit has been not only to Mirage Resorts' internal but also external customers. Mirage Resorts' IT staff are measured against their ability to deliver on IT SLAs, so the installation has been a professional win for them, as well.

Finally, Mirage Resorts estimates that it has saved \$3 million in IT staff compensation alone over the past two years. The savings come on a \$500,000 investment in the PATROL Enterprise Manager system and related modular tools from BMC Software.

The installation of PATROL Enterprise Manager kicked off an all-out IT best practices effort at Mirage Resorts. Because the installation was so successful, it



Max Watson, CEO, BMC Software, Inc. (left); Glenn Bonner, CIO, Mirage Resorts, Inc. (right)

is being used as a management model throughout the company. For instance, Mirage Resorts has since centralized its PC software installations and troubleshooting and has closed four computer rooms. In addition, systems in the Bellagio and Beau Rivage sites were the first in the company's history to go live with computer rooms that are managed remotely. "This was enabled completely by PATROL Enterprise Manager," says May.

PATROL Enterprise Manager's consolidation of multiple system views onto a single screen with a common interface has eliminated the training headaches of the multi-vendor management environment. Mirage Resorts is also realizing its goal of making the most of each employee's talents. "Since they are no longer spending all

their time fire-fighting, our technicians are becoming platform specialists and are performing more analysis, making their jobs more interesting and aiding in staff retention," May says.

The scripting capabilities in PATROL Enterprise Manager have automated 2,500 of Mirage Resorts' 10,000 manual tasks, including nightly hotel system pre and post audits and point-of-sale audits. This has reduced manual operations by approximately 400 hours per week. It has freed up technicians from clerical duties and has vastly reduced human error, May says.

The company says there are user requests that it once could not satisfy but now can because of PATROL Enterprise Manager. For example, the software's scripting capabilities have allowed the com-

pany's payroll manager to be automatically notified when certain events take place.

May says that PATROL Enterprise Manager has reduced service downtime because of its ability to quickly correlate events, which enhances troubleshooting, and because of its automation strengths. For example, Mirage Resorts established alerts so that when server disk space reaches a specific percentage consumed, PATROL automatically logs onto the system and expands the file space capacity. Also, the product has been customized to identify certain SQL errors and fix them before they affect users.

The resulting boost in uptime of Mirage Resorts' systems — including the company's Casino, Credit and Marketing; Slot Marketing; Hotel, Food & Beverage; Ticketing; Retail and other key applications — translates into benefits for Mirage Resorts' customers. "With PATROL, we have less downtime of our system, which translates into a better experience for the customer," May says.

For others who may embark on centralized enterprise management processes and automation, May advises dedicating staff resources to implementing the system. When Mirage Resorts got started, its approach was to have staff already immersed in daily operations find the time to handle the implementation project. Mirage Resorts discovered, though, that already-busy staff did not have the luxury to focus strategically on the PATROL Enterprise Manager implementation and future impact.

At press time, Mirage Resorts was in the process of merging with MGM Grand, Inc., which owns another nine casino properties. May says that at this juncture, the existing command center is slated to go right on monitoring and automating the MGM properties, too. "Now that we've found it, we don't expect our best practices model to change," she says. ♦

MIRAGE RESORTS, INCORPORATED

<http://www.mirageresorts.com>



Max Watson, CEO, BMC Software, Inc. (left); David Anderson, project manager, Worldspan, Inc. (right)

Worldspan

The travel services giant grows its customer base and service portfolio without adding IT staff

Worldspan, Inc. is no stranger to the stringent system uptime demands now becoming common amid the e-commerce frenzy. For many years, Worldspan and its brethren in the travel services industry have relied on fault-tolerant computer reservation systems (CRSs) to host mission-critical travel-related applications, which must be kept running around the clock.

Still, as business processes across all industries grow increasingly automated, service-level expectations continue to rise

at Worldspan, one of the world's largest CRSs. Its bottom-line mission is to deliver new levels of service to a growing base of worldwide subscriber organizations and to launch new e-commerce services—all with little or no additional IT headcount, says David Anderson, project manager at the \$722.5 million, Atlanta-based company. These goals are being met by an ongoing, company-wide IT automation project that has been designed around BMC Software's PATROL Enterprise Manager, formerly called COMMAND/POST, centralized event management system.

**GOLD
AWARD
WINNER**

Raising the availability bar

Worldspan is committed to providing nearly nonstop access to airline, hotel room, rental car and other travel-related data from hundreds of providers, as well as transaction processing, reservations, and ticketing capabilities to the 18,500 worldwide travel agencies that subscribe to their services.

Delivering on its ambitious customer commitments requires that Worldspan monitor some 10,000 devices and an intricate web of worldwide frame-relay links. And action on problems must be taken fast.

"We deliver management information to our help desks within five minutes of a system or network occurrence," Anderson says. "Achieving that means we must now

be 100% proactive in troubleshooting." The five-minute notification standard compares with a pre-automation scenario of up to 45 minutes for a help desk to be alerted. The reason was that at the time, it was not uncommon for users to be informing IT staff of problems or outages, rather than the other way around.

Eight-fold drop in repair time

Because it consolidates a comprehensive view of system and network events and alarms on to a single display with a common interface, BMC Software's PATROL Enterprise Manager enterprise management system has helped Worldspan slash its IT problem resolution time by nearly eight-fold. For one thing, the software enables technicians to make associations among separate alerts. Instead of opening individual trouble tickets for each problem, technicians can determine that there is likely a bigger-picture issue at hand.

All Worldspan subscriber companies are linked to a sprawling frame-relay network supplied by AT&T, which connects them to Worldspan host services at varying speeds. "If we have fully populated an AT&T circuit in Denver with travel agency customers, and we start seeing that a certain percentage of these connections are failing, we can determine that the cause is likely the carrier's facility, rather than, say, an individual host interface somewhere," Anderson explains. "We can alert AT&T that there is a T1 down in Denver."

Generating such information quickly in the automated fashion enabled by PATROL has dramatically reduced Worldspan's mean time to repair (MTTR). In March of 1998, Worldspan implemented automated trouble ticket generation based on PATROL Enterprise Manager event correlation, and in the third quarter began publishing the tickets to its intranet Web site to alert help desks and management. The intranet trouble ticket page is updated every minute and provides a real-time display of the open issues as well as a work list for technicians.

Initially, MTTR at Worldspan dropped from 446 minutes to 123 minutes on average per trouble ticket (well below a corpo-

rate goal of 240 minutes). In the fourth quarter of 1998, it fell further to a 60-minute average. "We feel that this drastic improvement is due to the automated ticket generation, which requires less paperwork and time, and the fact that all problems in excess of five minutes are tracked and placed in public view [via the intranet]," Anderson says.

Doing more with less

The centralized automation monitoring capabilities of PATROL Enterprise Manager are also enabling Worldspan to do more with less. Before the PATROL installation, Worldspan had to expand its IT staff incrementally as it added new cus-



Now, we can add less incremental headcount to take on new business, which is the bottom line.

DAVID ANDERSON

tomers and services. "For example, if we gained three customers, we had to add two technicians for monitoring," says Anderson. "Now, we can add less incremental headcount to take on new business, which is, of course, the bottom line."

For example, in early 2000, Worldspan took on a new business venture: hosting Web services for non-Worldspan participants. Because of the automation enabled by PATROL Enterprise Manager, the company launched and maintained this new service with no new staff hires, Anderson notes.

Overall, the number of remote sites a single technician can support has increased dramatically. A technician can now support

500 sites, up from 150 sites supported per technician in the pre-PATROL Enterprise Manager era, says Anderson. Feedback the IT group has received from the sales force reinforces this finding. According to Anderson, the Worldspan field is reporting that time it once spent responding to trouble calls is now being used to serve additional subscribers.

Proof in the pudding

In 1999, Worldspan contracted with GartnerGroup to analyze and benchmark its data center operations against the industry and to identify areas for improvement. Gartner reported that Worldspan was outperforming most of its peers. Worldspan's IT costs were 42% lower than the average of peer companies and 11% lower than the average of Gartner-identified top 10 performers.

Because of the value it has added to managing the Worldspan business, PATROL Enterprise Manager was among a few projects not subjected to cutbacks in Worldspan's 1999 budget review meetings. Additional funding was obtained in 1999 for expansion and, late last year, Worldspan extended its PATROL Enterprise Manager installation by adding backup servers with added redundancy. The company was clever about its implementation, having the backup network do double duty as a development network and as a backup network.

Anderson anticipates that Worldspan's next IT automation milestone will be to install the remainder of BMC Software's PATROL 2000 software for cross-platform application management. "That will enable us to look at processes and components within our data center and further confirm or eliminate additional failure sources," he says. "We hope to be getting rid of our current manual systems for inboard systems monitoring and outboard systems processing." ♦

WORLDSPAN, INC.

<http://www.worldspan.com>

Bank of America

Using PATROL Enterprise Manager, this financial institution has vastly improved customer service, availability and reliability



Paul Marshall, vice president and systems manager, Bank of America

How would you like to be responsible for the safe passage of \$300 billion every day? That's the amount the international payment delivery systems handle daily at Bank of America. "Whether the transaction is as small as a few dollars or as large as several million, we must treat them as though they are all worth a billion dollars," says Mervyn Gutteridge, senior vice president, based at the bank's data center in Croydon, England.

Bank of America has dramatically improved its service levels to meet that goal with PATROL Enterprise Manager (formerly called COMMAND/POST) from BMC Software. With solutions based on PATROL, the global financial institution has been able to consolidate operations platforms and implement message management and automation.

The bank has two other data centers in Bromley and London, England, and a

fourth in Kuala Lumpur, Malaysia. The centers operate global wholesale banking and global cash management systems; trading floor systems for 34 dealer locations; and payments and clearing interfaces for all major currencies and central banks. The challenge facing Gutteridge and his colleague, Paul Marshall, was to efficiently monitor these critical systems in a user-friendly environment.

**SILVER
AWARD
WINNER**

The answer was to consolidate the key systems into an enterprise management automation system and a single monitoring platform via PATROL Enterprise Manager. Now, personnel log into one of the 15 workstations in the Croydon service center, and their workstations are configured to their specific skill sets. As technicians complete more training, functionality is added to their software profiles. In essence, they are technical support analysts and a first-level technical help desk.

"We have an environment in which people can learn and progress," says Marshall, vice president and systems manager for Bank of America. "We have a highly motivated staff and our attrition rate is lower."

Without PATROL and automated management, Gutteridge says the bank would have needed 350 monitors and the personnel to watch them. "It would be an unpleasant, ineffective and expensive environment, and we couldn't possibly have provided the quality of service we do today," he says.

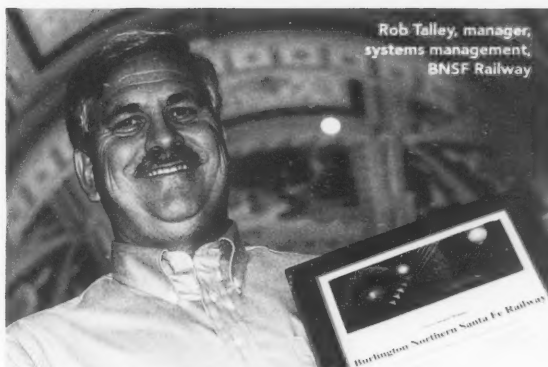
His internal customers asked that their monthly service-level meetings be reduced to once a quarter because of lack of problems to discuss. In addition, while the department's workload increased by approximately 100% over three years, its headcount decreased by about 30% in the same timeframe — and technology incidents resulting in financial losses have decreased from several each month to about one in every quarter.

Quality is so superior that the automated management benefits are part of the bank's sales message. "We frequently bring clients into the data center and demonstrate the automation system capabilities," Gutteridge explains. "Clients are clued to the fact that the products we deliver to them are only as good as the systems that run them."

Gutteridge and Marshall continue to bring new systems under their PATROL automation umbrella, a process they view as simply adding a connection to a system that is flexible and scalable enough to meet whatever the future holds.

"Automation management is a culture, a way of life, a way of thinking," says Gutteridge. "The project never has an end; it's always evolving." ♦

BANK OF AMERICA
<http://www.bankofamerica.com>



Rob Talley, manager,
systems management,
BNSF Railway

Burlington Northern and Santa Fe Railway Company

SILVER
AWARD
WINNER

*PATROL helps keep
the trains rolling,
meeting 98% to 99%
system availability*

Whether they're moving coal or cardboard, cars or containers, the shippers that rely on The Burlington Northern and Santa Fe Railway Company (BNSF) to transport their goods from one end of the United States to the other want up-to-the-minute data

about their shipments, wherever their location in the vast railway system.

"We never forget our big C, the customer is the shipper," says Rob Talley, manager, systems management, BNSF Railway. To keep shippers happy, BNSF Railway business units access data about shipments, train operations, efficient routes, available locomotives and rail maintenance — all through the systems Talley monitors.

The challenge was to provide a single view of those systems, instead of looking at individual segments — an inefficient approach requiring an operator to talk with operations personnel manning other terminals to pinpoint a problem, Talley says.

"We wanted to give everyone the same view of the alerts, whether the issue was in a mainframe, the network, a server, or an application," he says.

BMC Software's PATROL Enterprise Manager (formerly called COMMAND/POST) was chosen because of its ability to provide an enterprise view of events from a system.

Talley and his team succeeded, a fact he attributes to the people, processes and procedures as much as technology. "The BMC Software Silver Award represents not just what my team has done, but the entire efforts of our IS staff," he says. "The Award recognizes the dedication of BNSF's IT professionals to making the system work."

Talley's team quickly identified the most critical systems to manage. "That gave us a direction for our initial implementation, so we could get the biggest bang for our bucks and show management we were making progress," Talley says.

A key feature is the system's ability to consolidate alerts from multiple systems into one monitor. For example, Talley uses BMC Software's MAINVIEW® line of products in his mainframe environment, with MAINVIEW forwarding alerts to PATROL Enterprise Manager, which his team has customized with additional help functions and system maps. That enables operators to quickly identify conditions that might lead to an outage and rectify the situation before any downtime occurs.

For 1999, BNSF established goals of 98% to 99% availability for key business systems, applications and servers. With help from the solution built on PATROL Enterprise Manager, all 1999 availability goals were achieved.

If a major problem ever occurs, there's a Critical Problem Review to identify and rectify the root cause.

"We have a continuing cycle for improvement," Talley notes. "The ultimate winners are the BNSF Railway customers who ship with us." ♦

**THE BURLINGTON NORTHERN
AND SANTA FE RAILWAY
COMPANY**

<http://www.bnsf.com>

Pacific Gas & Electric

PATROL helps utility save money, streamline operations and improve service and reliability

Most utility company customers never know what efforts are required to keep their refrigerators humming and their computer cursors blinking. But at Pacific Gas & Electric (PG&E), internal customers hear a lot about what it takes to keep the systems working smoothly.

"You must constantly tell people what you're doing," says Joseph Soldevila, automation project manager for the Fairfield, Calif.-based company. "If you prevent problems and people don't understand how you're doing that, they wonder if they're getting their money's worth."

That's why Soldevila has explained the benefits of PG&E's enterprise automation solution in more than 30 presentations posted on the company's intranet. The solution includes BMC Software's PATROL Enterprise Manager (formerly COMMAND/POST) and is part of a story that led to a Best Practices Silver Award from BMC Software.

"Our ability to show how we integrated our automation tools to provide high availability of corporate applications across the enterprise was one of the key metrics that allowed us to win this award," says Dana McKibbin, director of Fairfield and San Francisco operations at PG&E.

Before his group implemented the automated enterprise management solution, the end-user groups wanted to monitor critical systems using their own tools instead of his group doing so. That was counter to the IT organization's goals of

consolidating, automating and focusing on enterprise versus platform solutions.

In addition, the systems under Soldevila's control were viewable from separate tools, and took many IT operations personnel to monitor them. "No matter how good you are, you're bound to miss something with that volume," Soldevila notes.

His goal: Save money, streamline operations and improve performance. It will be accomplished by enhancing his group's services, convincing other users to let him monitor their systems — and bringing his department into alignment with the IT organization's objectives.

To accomplish this, Soldevila's team implemented an automatic notification en-

gine as part of their enterprise management solution, which incorporates BMC Software's PATROL Enterprise Manager and MAINVIEW line. The engine enables operations personnel to quickly see and address high-priority system issues. "Our systems generate more than two million alarms a day and not all of those are important," Soldevila explains. "This technology suppresses the non-critical issues, so we can focus on the big-ticket items."

For instance, the MAINVIEW products used in PG&E's mainframe operations area monitor and automate that area so that it's rare that human intervention is required. When it is, alerts go up to PATROL and the notification engine. The engine automatically sends alerts to key operators and users in the manner they've requested.

PATROL Enterprise Manager has enabled his group to prevent problems from escalating into major system outages. Further, "As we add new applications and systems, I don't have to add staff. I plug these things into the enterprise system and work with the client to find what they need notification on," says Soldevila.

PACIFIC GAS & ELECTRIC
<http://www.pge.com>

**SILVER
AWARD
WINNER**



Dana McKibbin,
director of Fairfield and
San Francisco operations
at Pacific Gas & Electric

Getting to the Winner's Circle

Awarding BMC Software's customers for a job well done

BMC SOFTWARE'S fourth annual Best Practices in Enterprise Management Awards Program culminated at the Assurance 2000 (A2K) user group with the announcement of this year's winners. The A2K conference brings IT professionals from around the world together to learn how to optimize BMC Software solutions to get the most from their own people and systems. In addition, this conference gives participants a first look at what the company is planning for the future.

And the winner is

The awards ceremony was held on May 22, 2000 at the Venetian Hotel in Las Vegas, along with the A2K conference. This highly coveted award has become an industry hallmark for recognizing exceptional IT achievements. This year's Gold Award winners are Mirage Resorts, Incorporated and Worldspan. Silver Award winners include Bank of America, The Burlington Northern and Santa Fe Railway Company and Pacific Gas & Electric.

This year's program was a great success and competition was intense with entries coming in from around the world. Industry experts from The Butler Group, Enswers.com, Enterprise Management Associates, GartnerGroup, Giga Information Group, Hurwitz Group, and International Data Corp. carefully reviewed the entries and selected the Best Practices in Enterprise Management winners. Each entrant was asked to communicate how its organization has linked its enterprise management strategy to business objectives, including measurable achievements. Entries were reviewed and judged on critical success factors such as the planning and evaluation process, the scale, creativity and quality of the implementation and the demonstrable results achieved to date.

"The fourth annual Best Practices in Enterprise Management Awards Program truly reflects the outstanding accomplish-



Max Watson, CEO
BMC Software, Inc.

ments of BMC Software's customers," said Wayne Morris, vice president of corporate marketing, BMC Software, Inc. "We are delighted to see that these IT groups are maintaining such a high level of service for their respective organizations. Not only does this award program reflect that, but it also validates their commitment to achieve the critical success factors that are so necessary in today's strategic IT environments." Participants highlighted the true value and efficiency of implementing Enterprise Management strategies and tying them to business processes using BMC Software solutions.

About BMC Software

One of the world's largest independent software vendors, BMC Software delivers the most comprehensive e-business systems management software with the fastest guaranteed implementation. This Service Assurance™ strategy enhances the availability, performance and recoverability of companies' business-critical applications. Companies can use this management methodology to demonstrate their ability to deliver optimal service to their customers and partners by joining BMC Software OnSite™, a certification program that includes solution implementation and regular HealthChecks performed by BMC Software Professional Services. BMC Software is a Forbes 500 company and a member of the S&P 500, with fiscal year 2000 revenues exceeding \$1.7 billion.

The company is headquartered in Houston, Texas, with offices worldwide.

Visit us at: www.bmc.com ♦

Judging the Contest

Industry experts carefully reviewed the entries and selected the **BMC Software Best Practices in Enterprise Management winners for 2000**. The distinguished panel of judges included:

Gary Cooper
IT Research Analyst
The Butler Group

Steve Foote
President and CEO
Enswers.com

Patrick Dryden
Industry Analyst
Giga Information Group

Paul Mason
Vice President
International Data Corp.

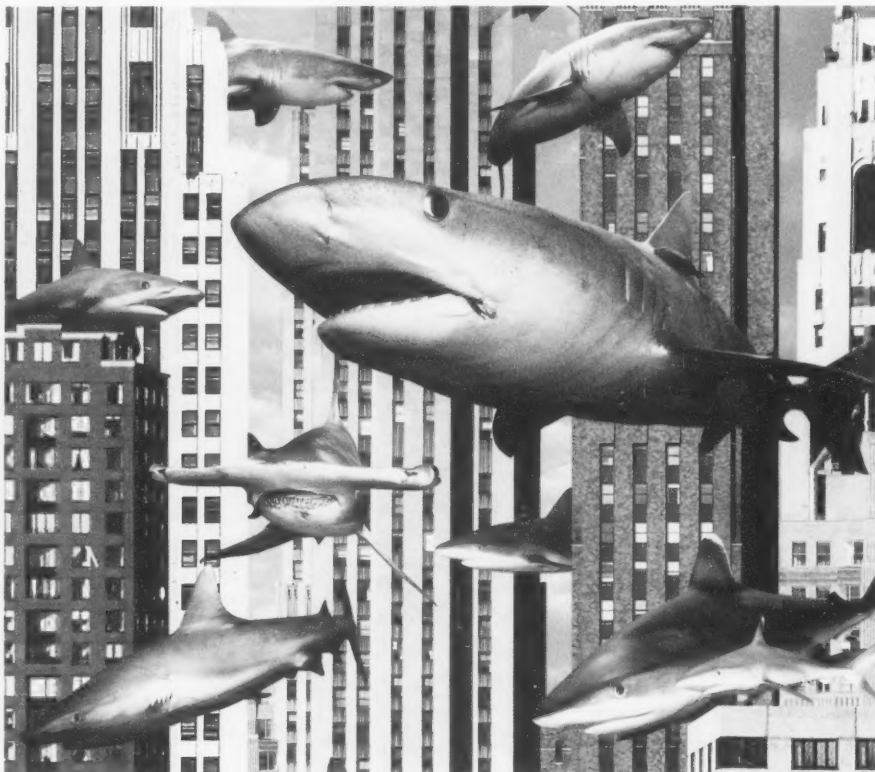
Ray Paquet
Vice President/
Research Director
GartnerGroup

Rich Ptak
Vice President Systems and Applications Management
Hurwitz Group

Rick Sturm
President
Enterprise Management Associates



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LENNY LIEBMANN

The challenge of working with multiple ASPs

APPPLICATION SERVICE providers (ASP) are actively infiltrating corporate IT environments at the enterprise, departmental and even individual end-user levels. Whether that's good or bad is anyone's guess. But it's a reality IT managers must confront.

In general, IT managers are better off embracing such change rather than fighting it. The PC is the classic example of a technology successful IT managers quickly decided to understand, manage and integrate.



LENNY LIEBMANN is an independent consultant specializing in the alignment of IT resources with business goals. Contact him at llmann@home.com.

To resist the PC was to fight a losing battle and, ultimately, to defer the competitive gains it offered. The right move was to build networks that linked PCs, so their capabilities could be effectively shared across the organization.

In the case of ASPs, integration is a particularly thorny issue. ASP applications run on servers that

someone else owns and administers. As these applications become more important to your organization, how will you ensure that the data and processes they contain don't become isolated from the rest of your IT environment? How will you prevent them from becoming islands of information?

More specifically, can you tie the travel and entertainment expense-tracking ASP your salespeople are using to your own financial data? Or can you link the ASP your marketing people use to collaborate with outside contractors to your in-house workflow platform?

Solutions to these problems are already starting to appear. Some ASPs offer integration with specific enterprise applications. ASP "aggregators" claim that if you go through them for all your application needs, they will provide the app-to-app links you require — typically via XML.

The problem, of course, is that you're limited in your choice of ASPs to those in your aggregator's portfolio. And it will be very difficult to change your aggregator because your integration will depend on its particular XML engine.

Another approach is to build your own links between your ASPs of choice and your own applications. This can protect you from the vagaries of any individual service provider, especially if you've negotiated a good "out" clause in

your ASP contract. The danger is that you'll create a bunch of one-to-one connections. That can be a lot of work and turn out to be too inflexible over the long haul.

A better potential solution may be to create an architecture that makes ASP application data and processes available to any other ASP or enterprise application. But this approach requires some very sophisticated enterprise application integration technology that can be quite expensive to implement.

Regardless of the particular architecture you employ, it's important that you develop a strategy for multi-ASP integration. If you don't, you'll soon find yourself in the same situation you were in a few years back, when you were trying to get your heterogeneous client/server, mid-range and mainframe apps communicating with each other.

As we all know, any IT asset multiplies in value as you make it work with other resources. These capabilities are essential to the value of any ASP engagement. Don't wait until your users are already hooked on their ASP apps before you decide how you're going to make them work with each other and with your organization's own IT resources. ■

JOHN GANTZ

Message to IT: Help your firms profit from Web

DID YOU KNOW that almost half of all Internet commerce sites are profitable? I didn't either. I thought, from what I read about the dot-com implosion this spring, that Internet commerce was surely a black hole sucking venture capital into an alternate universe faster than politicians can spend a budget surplus. I worried for the future of my trillion-dollar Internet commerce forecasts.

But then I looked at the results of International Data Corp.'s (IDC) most recent poll of its U.S. Internet Executive ePanel. Of the more than 600 sites surveyed, 42% said they were already profitable, and 13% expect to be profitable by the end of the year. Fewer than 20% said they didn't know when they'd be profitable. When we asked this question a year ago, profitability looked a lot further off.

Not only that, the respondents who said they measure the return on investment (ROI) of their

Web sites (although most don't, for a variety of reasons) said they were three times more likely to say the ROI met or exceeded expectations than to say it was below expectations.

The reason isn't because manna has suddenly fallen from heaven. It's because cooler heads are now in charge of the Internet economy. Despite the wide coverage of Internet start-ups and a handful of well-known sites like Amazon.com and eBay, brick-and-mortar companies are conducting most Internet commerce.

In fact, on head count alone, brick-and-mortars account for more than 95% of all employees who work in online businesses. Internet start-ups may be able to bet other people's money on their business plans — and a few might succeed — but department heads and business unit managers in off-line companies know they need to be self-sustaining sooner.

Now that the market has embraced the profits-are-important school of thought, I have some advice for those of you managing the technology behind your companies' Web sites:

■ Make sure your company is making a profit off its site or will soon. Only profits will ensure continued investment in the site.

■ If your firm has an e-commerce site, make sure it takes it seriously. In the IDC ePanel, the brick-and-mortar companies surveyed were already getting 20% of their revenue online. Next year, they expect to hit 30%.

If your company's revenue targets aren't high enough, you won't really be competitive. If your company isn't shooting for at least 5% of its revenue from its Web operations this year, it's probably behind the eight ball.

■ Make sure the powers that be at your company understand that it costs as much to maintain a site as it does to implement it. The average company in the IDC ePanel spent \$1.6 million building its site, then another \$1.7 million maintaining it. Lots of companies spent less, and plenty spent more, but the ratio was the same — about a dollar in annual maintenance to each dollar spent building the site.

■ In choosing technology vendors, look first for those with top-notch support and second for those with skills and products that help integrate with legacy systems. These are hard-to-duplicate attributes that can help you avoid missteps.

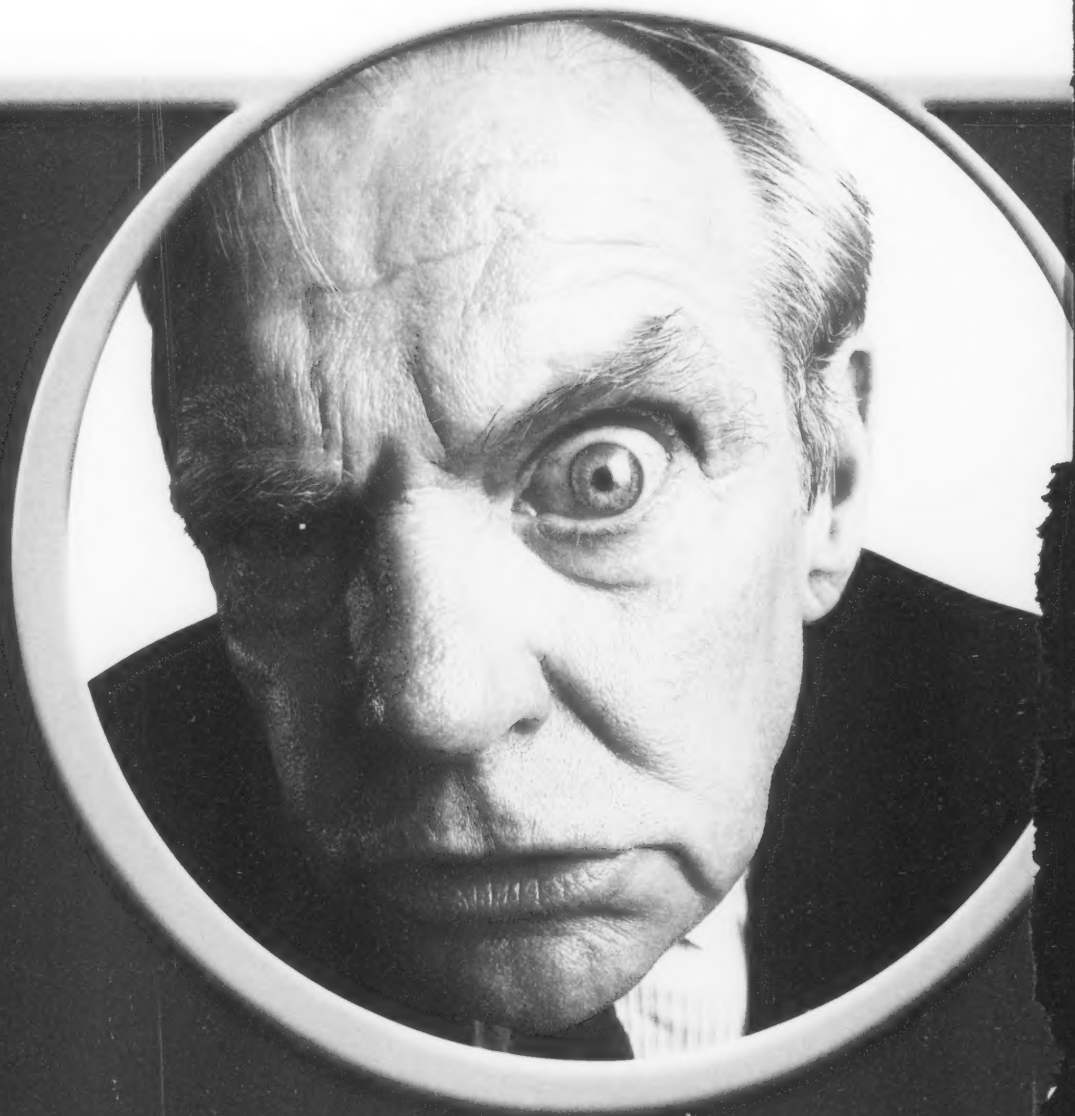
■ Overbuild security. The top concern of executives polled from medium-size and large companies was about security breaches occurring and being publicized. That was even higher than concerns about taxing e-commerce or system outages.

As an IT professional, there's actually little you can control about the success of your site — such as business unit funding, top management commitment, savvy marketing and competition — and a lot for which you can be blamed, such as outages, security problems, confusing interfaces and missed deadlines on back-end integration projects. Sometimes it just doesn't seem fair.

But rest assured that when the executives were asked what steps they would likely take to make their sites profitable, cutting staff rated last. ■



JOHN GANTZ is a senior vice president at IDC in Framingham, Mass. Contact him at jgantz@idc.com.

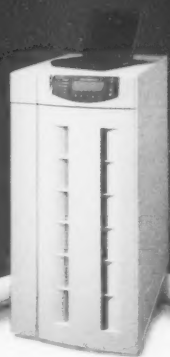


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READERS' LETTERS

Use of imported labor isn't helping American IT workers

THE COLUMN "A Foreigner's Plea: Make It Easier for Us to Work in U.S." [News Opinion, June 19] is drivel.

It is legitimate to bring in outside contract help to cover internal labor shortages. But these should be clearly understood as temporary positions that will be backfilled by U.S. citizens as soon as they can be trained and brought into the workforce.

Companies shouldn't be permitted to use H-1B employees unless they are actively helping U.S. citizens qualify for those positions.

It astounds me that Mohan Babu thinks the U.S. is India's land of opportunity. India needs these professionals even more desperately than the U.S. I am unable to sympathize with such a purely selfish motivation.

Marc Ruby
Warren, Mich.

MOHAN BABU'S assertion that six years is too short a time to work in the U.S. on an H-1B visa is absurd. H-1Bs are granted for temporary work only. How long should "temporary" be? In the IT industry, six years is an eternity.

Mr. Babu, you are here because of the graciousness of the U.S. people and the government. Don't abuse that graciousness, and don't bite the hand that feeds you.

Michael Amorose
San Jose

MOHAN BABU'S plea completely avoids the real controversies surrounding the H-1B hoax. He decries the restrictions surrounding his foreigner work status: an undesired bond to his employer, copious amounts of red tape and a fear of the "uncertainties" of corporate America.

Well, welcome to the U.S.A., Mohan, and for that matter, welcome to our world. Surely almost every U.S. IT worker has voiced these concerns.

The bottom line: There is no shortage of U.S. IT workers. U.S. firms will hire you because you're supposedly cheaper for them, and that rankles many job-seeking U.S. IT workers.

Gary Rodriguez
Phoenix
andre@theriver.com

MOHAN BABU

A foreigner's plea: Make it easier for us to work in U.S.

PORTUGUESE EXPLORER Vasco da Gama faced a diplomatic dilemma when he landed in southern India in the late 15th century. A local king didn't want foreigners to come in and disturb the social equilibrium. He sent an emissary to da Gama's camp with a symbolic gesture: a glass brimming with milk. This symbolized that India's society was full and content and didn't need anyone to come in and change that.



MOHAN BABU is an IT consultant and native of India who is working in the U.S. on an H-1B visa. Contact him at mohanbabu@att.net.

Indians are reaching out to the globe, including the U.S., and the already full glasses of technology are dropping.

Indians form a sizable tech professionals who want visas to work in the U.S. Naturalized?

I DON'T WANT to make it easier for Mohan Babu to work in the U.S. until all U.S. citizens are working.

I have more than 25 years in the computer field and eight languages under my belt, but I'm currently out of work.

I went back to school to learn Java and Web develop-

ment because I love the new stuff, but it hasn't helped.

I did Web sites for nonprofits to get hands-on experience, but to no avail. I also taught HTML to Cobol programmers so they had a head start, but it hasn't helped them.

I know of other older Americans with a lot of good business and technology experience who have been laid off because it's easier to get folks from abroad who have already been trained than to train our own people.

Karen Mermel
Project manager
Hanover Park, Ill.
kmermel@yahoo.com

MOHAN BABU states that an H-1B visa holder "can't look around for better opportunities in the open market and is almost bonded to his employer." However, an article on Page One the same week [June 19] titled "Tech CEOs May Be Forced Home" states that "Indian and Chinese workers started almost 3,000 companies and created almost 60,000 jobs in 1998, according to a University of California study."

How does an H-1B visa holder who is bonded to his employer become CEO of a start-up?

If an H-1B visa holder who is allowed into the U.S. to fill an existing position instead creates new positions, it seems to me this exacerbates the worker shortage.

It also shows that the plight of H-1B visa holders isn't as dire as Mr. Babu portrays it. **Stephen J. Piccone**
Levittown, Pa.

No way to save money

GRANT KENNY and Tad Stephens [Readers' Letters, June 19] both seem to be under the impression that companies are seeking to save money by hiring immigrants.

This could hardly be further from the truth. As a holder of an L-1 intracompany transfer visa, I have hired a number of

foreign nationals and U.S. citizens over the past few years. The idea that foreigners are offering their services up cheap is pure fallacy.

Given the current state of the IT employment market, I also find the notion that businesses are in the process of setting up IT sweatshops in the U.S. laughable. We are experiencing an extreme employees' market, with companies forced to pay top dollar for what are often underqualified staff. Truly skilled IT workers are a valuable commodity being put at risk through INS inaction and lack of government focus on the issue.

Those of us whose lives are currently in the hands of the INS continue to pay U.S. taxes and have no access to the legislature to influence a situation that makes us prisoners of our current employers.

David Fleming
Watertown, Mass.

A corporate cop-out

LET'S FACE IT: There isn't a shortage of skilled workers; there's a shortage of specific skills. Corporate America feels it's cheaper to replace workers who have older skill sets with foreign workers who have specific skills. That's the bottom line.

If firms went back to the standard practice when the industry was young — hiring talent and training for skills — this shortage wouldn't exist.

Today's Java programmers are going to be in about as much demand as OS/2 server administrators in a couple of years, so companies will sweep the current crop of foreign workers out the door and back overseas in order to replace them with youngsters with the latest hot skill.

Keith Stone
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Don't overlook Novell

DEBORAH RADCLIFF'S "Security, the Way It Should Be" [Technology, July 10] was a good, 50,000-foot view of where network security needs to be. I am disappointed, however, that she failed to mention Novell.

Take another look. You won't get code-level review any more than with any other

proprietary system, but the combination of NetWare, NDS eDirectory and BorderManager does get you the granularity of authorization levels and the business rules-based security posture you're looking for.

Novell has also come a long way in centralized network/security management consoles and is less vulnerable to the risk of applications having root-level authority.

Lance Groth
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Office of the Legislative Auditor
St. Paul, Minn.
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IT WAS GRATIFYING to see distributed firewalls recently discussed so intelligently in your publication. It validated much of the work my company is doing and the product we have developed. Distributed firewalls are clearly more compatible with today's networks with their goal of being business-enabling than traditional perimeter firewalls, which rely on bottleneck topology. They are also easier to deploy within the network and can protect entire server farms, network segments, individual mission-critical server or enterprise desktops. They help enable the merging of business and security roles.

Avi A. Fogel
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Network-1 Security Solutions Inc.
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fogel@network-1.com

Vote for computer literacy

TOO BAD we have a Congress that is computer-illiterate. This bill ["U.S. House Passes Antispam Bill," *Computerworld Online*, July 19] makes people think they can freely opt to "unsubscribe" from the source of spam. In fact, the spammer probably never intended to sell its obnoxious product in the first place; it wants you to send an "unsubscribe" e-mail so it can validate your e-mail address. After you opt out, you don't get any more spam from the original address, but you get new spam from the companies renting the validated e-mail list.

Richard H. Caro
Vice president
ARC Advisory Group
Dedham, Mass.



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BUSINESS

CAMP FEDEX

Forget about scavenger hunts and archery competitions. Federal Express' new one-day technology camps teach kids about using Internet search engines, building Web pages and gaining practical skills for careers in information technology. The hope, say FedEx officials, is to inspire future IT workers. **40**

IN THE FLESH

Online banks are putting faces to their names. Two virtual-only banks recently announced partnerships with Mail Boxes Etc. that will allow customers to make deposits at store locations. **41**

PERKS GALORE

Facials, health insurance for pets and bonuses for spouses. With today's tight labor market, companies are fiercely competing for new staff and doing everything possible to hang on to the talent they already have. But higher salaries and cash bonuses are just the beginning. The new trend is to offer the most generous, creative perks imaginable. **42**

ASP POTENTIAL

The growth of application service providers (ASP) is inevitable, say analysts. AMR Research predicts the market for ASPs handling enterprise resource applications will reach \$4.7 billion by 2004. But are ASPs adequately prepared to handle the growing workload? *Computerworld's*

Thomas Hoffman and eBizChronicle.com's Sarwar Kashmeri recently spoke with a panel of experts about the future of ASPs. **46**

BEYOND THE JOB FAIR

Scoping universities for talent is an old recruiting trick. But now it takes more than one appearance on campus to lure IT workers. Lockheed Martin sends employees to the University of Virginia for guest lectures, coordinates student-led projects and works closely with the college to tap potential IT employees. **49**

HIRING THE DISABLED

IT is a profession that's well-suited to people with disabilities, says Richard Dodds, a technology director at Community Options. But there's a long list of barriers preventing people with disabilities from landing jobs in corporate IT. In an interview with *Computerworld's* Melissa Solomon, Dodds offers advice on how companies can tap into this largely invisible workforce. **54**

QUICKSTUDY

First the focus was on getting online. Then e-commerce strategies were developed. The next step, say consultants, is for companies to develop new benchmarks to measure their online performance. **58**

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"THE INTERNET is still the future. There are still huge opportunities," says Gary Fernandez, CEO of GroceryWorks.com

FADING GLORY OF DOT-COMS

A YEAR AGO, everyone who was anyone was rushing to join a dot-com. But faster than a passing teen fad, dot-coms have become, well, so last year. In the wake of the recent dot-com shakeout, these companies are doing just about everything they can to deceive job candidates into believing that they're not dots.

52

FedEx Grooms Teens At Technology Camp

Company shows its training facilities to potential future employees

BY JULEKHA DASH

WHILE MOST teen-agers' idea of "camp" involves outdoor sports, Memphis-based Federal Express Corp. launched one this summer to help fill information technology jobs — five or 10 years from now.

Held in four locations — Memphis, Dallas, Orlando and, most recently, Colorado Springs — the one-day technology camps initiated by FedEx included lessons in using Internet search engines and building Web pages, as well as information on technology careers.

Though it may be years before the students enter the workforce, the company hopes its efforts will bring it technology-savvy employees in the long run.



FEDEx HOPES STUDENTS who attend its technology camps, like the one seen here, will be ready to join the IT workforce in about 10 years

"We're sowing the seeds for the future," said Jim Wallace, supervisor of the technology camp and manager of FedEx services recruitment. "We're trying to be more strategic in getting students interested in technology. The worker shortage will continue."

Camp participants could become FedEx interns within five years or full-time employees in less than 10 years, he added.

Thinking Ahead

Although many companies complain about the workforce shortage, not many are thinking about long-term remedies to the problem, said Barb Gomolski, a research director at Stamford, Conn.-based Gartner Group Inc.

One exception is San Jose-based Cisco Systems Inc., which sponsors a Cisco Networking Academy that teaches high school and college students how to build networks.

While others could easily

duplicate such efforts, "most companies don't want to hear that they have to start talking to seventh-graders" when they need a Java programmer today, said Gomolski.

But they ought to, because middle school students are old enough to be thinking about future jobs, yet young enough that they are still impressionable, she added.

Gartner Group predicts that global demand for specialized IT skills will continue to outstrip supply by 20% through 2004.

Camp FedEx

Each FedEx camp took place at company training facilities and was led by four supervisors, including two high school teachers and two FedEx employees. Between 12 and 16 students — mostly seventh- and eighth-graders who were selected by officials at their regular schools — participated in nine different camps.

Wallace said schools were urged to select a mix of students, not just those who had the best grades.

"We see this as an opportunity to interest someone in technology who didn't know how it related to a career," said Wallace.

Wallace's daughter Cather-

Hacker/Fed Tensions Abound at Def Con

Attendees urged to use skills to do good

BY ANN HARRISON
AND MATHEW SCHWARTZ
LAS VEGAS

"We apologize for the delay," said a Def Con press attaché filling time before a stalled press conference in Las Vegas two weeks ago. "The CIA is caucusing in the men's room."

"Well, I'm so glad I left the tape recorder running in there," replied a British reporter calmly pouring Scotch. "Would anyone like a drink?"

Def Con — the annual gathering of hackers and the law enforcement agencies who chase them — drew more than 6,000 people to the Alexis Park Hotel.

It featured, among other curious spectacles, government

security managers alternately threatening hackers and begging them to accept job offers.

"Who's a hacker here?" asked David Jerrell, director of the Federal Computer Incident Response Capability (Fed-CIRC), during the "Meet the Fed" panel. No hands went up.

"You're going to bust us all!" someone from the audience yelled.

"We've got some of the most sophisticated toys in the world, if you'd like access to those toys," murmured Dick Schafer, the U.S. Department of Defense's director of information assurance, in another session on Def Con's main stage.

Of course, many of the young people wearing boots and telephone earpieces who were jacking in via Ethernet in the crowded hallways apparently weren't eager to meet civil service behavioral guidelines.

Some of the assembled hackers, many of whom appeared to be under the age of 21, were admonished by conference organizers for setting off smoke bombs, releasing bubble bath into the pool, stealing phones and reportedly pouring concrete down the toilets.

But the vast majority of attendees were simply there to exchange useful information and party with their friends.

Voice of Experience

"We are struggling with whether we need changes in personnel practices from the classic Beaver Cleaver profile for who is trustworthy," conceded a tired CIA officer after emerging from the men's room to talk about security and recruiting.

But the tension was at least as high between the older, more experienced hackers and

the youthful crowd they deride as "script kiddies."

During a presentation by the hacking group Cult of the Dead Cow, a member known as The Nightstalker castigated virus writers and script kiddies who launch attacks with simple programming scripts.

He said hackers should instead use their skills to develop tools to regenerate eyesight or help those with spinal cord injuries.

"All of you have the potential to perform miracles with hardware or software. I want you to make a choice to be creative," The Nightstalker told the crowd. "Any jerk can make a Visual Basic script, but it takes an artist to let someone walk or see or hear."

"Hacking into systems might be fun," said Jerrell during the "Meet the Fed" panel. "But there's no glory in being an asshole."

Jerrell pleaded with hackers to report security holes they find to him, instead of posting

them on the Internet for others to exploit.

Jennifer Granick, a criminal defense attorney in private practice in San Francisco, pointed out in a presentation on the legalities of hacking that an array of laws penalize everything from phreaking — hacking into phone systems — to reading someone's e-mail without permission.

Stiff sentencing guidelines also concern Def Con conference organizer Jeff Moss, who quit his day job in the intrusion-detection group at Secure Computing Corp. in San Jose last year to run the conference full time.

"It seems safer to run somebody over drunk than to hack into their system," Moss said. "With mandatory sentencing guidelines, there's just not much leeway in a case. I always worry that juveniles are going to wreck their lives." ■

MORE THIS ISSUE

For more Def Con coverage, see page 12.

ine, an eighth-grader who attended a camp in Memphis, said students were more relaxed learning computer skills outside of school, where they knew they wouldn't get graded.

"You didn't have as much pressure as you did at school. A lot of people did better on this," she said.

But did the 13- and 14-year-olds stay interested on warm summer days?

"Most of them, in the beginning, at 8 a.m. are yawning a bit," admitted Linda Heitzman, a senior IT recruiter who has supervised camps in Colorado Springs and Memphis.

Linda Goodwin, coordinator of academic technology at St. Mary's Episcopal School in Memphis, said that although many students may know how to use certain Internet features, such as instant messaging, they aren't usually as well versed in how to use a search engine or locate specific information. Goodwin spent the summer as a FedEx "teacher intern" and supervised the technology camp in Colorado Springs.

"Kids are not being given a lot of educational technology skills. In a lot of school systems, this has been pulled because of budget [constraints]," Goodwin said. ■

Internet Banks Establish Physical Presences

Mail Boxes Etc. deals are giving virtual financial services a brick-and-mortar face

BY MARIA TROMBLY

One persistent problem with online-only banks has been that it's impossible to walk up to a real person — or even an automated teller machine (ATM) — and hand in a deposit. That will change this fall, as new deals struck between two Internet-only banks and San Diego-based Mail Boxes Etc. go into effect.

The banks — Irvine, Calif.-based National InterBank and Wilmington, Del.-based Juniper Financial Corp. — will let customers make deposits to their online accounts from Mail Boxes Etc. locations.

Mail Boxes Etc. could become, in effect, a kind of branch office network for Internet banks, said Paul Jamieson, an analyst at Gomez Advisors Inc. in Lincoln, Mass. The most obvious next step, he said, is putting ATMs in Mail Boxes Etc. stores so customers can make cash withdrawals.

But that may not be enough, said Meredith Hickman, an an-

AT A GLANCE

Mail Boxes Etc. Delivers

E-commerce companies are teaming with Mail Boxes Etc. for a variety of services, such as:

- Accepting deposits from online bank customers.
- Accepting returns for online merchants.
- Checking the IDs of customers of online wine sellers.
- Letting buyers inspect goods before finalizing purchases from online auctions.

alyst at Celent Communications in Cambridge, Mass. "We've been saying for a long time that Internet banks won't work until they can put a physical presence in front of the customer," she said. "But I think that banks that have an actual branch presence will be the winners in the long run."

The new deals will let customers go to any of Mail Boxes

Etc.'s 3,400 locations and fill out deposit slips, get receipts and tracking numbers and then be notified via e-mail once money has been deposited into their accounts. The deposits will be shipped via overnight mail to the banks, which will pick up the shipping costs on behalf of their customers.

Bank representatives said they chose Mail Boxes Etc. because of its large number of locations across the country and its brand recognition.

"And they're very big on customer service, which Juniper is keen on," said Juniper spokeswoman Leslie Bottoms.

Although deposits will be the only transactions available at first, other services may be coming, said Ron Hynes, National InterBank's vice president of marketing. He declined to name specifics.

A Common Solution

Banks aren't the only ones looking at Mail Boxes Etc. to help them integrate the virtual and real worlds.

Fess Parker Winery in Los Olivos, Calif., uses Mail Boxes Etc. to ship cases of wine to the 10 states where such shipments



Internet banks won't work until they can put a physical presence in front of the customer.

MEREDITH HICKMAN, ANALYST,
CELENT COMMUNICATIONS

are legal. Customers who choose this delivery option have five days to come in to pick up their wine and show identification proving they're over the age of 21, said John Kenney, Mail Boxes Etc.'s director of corporate accounts.

Other online firms use Mail Boxes Etc. to let customers come in and sign loan or insurance papers and show proof of identity.

And later this year, Kenney said, eBay Inc.'s customers will be able to come in and inspect items they bought at the San Jose-based auction site and either approve payment or have the item returned. ■

SNAPSHOT

Most Pressing Technology Priorities

Three years ago, CIOs said the most pressing concern they faced was completing information technology application projects on time and within budget. Priorities have shifted, and CIOs now say their biggest concern is improving security. John J. Davis & Associates in New York surveyed 288 CIOs to determine the most important challenges for IT departments.

	2000	1997
Improve security and integrity of systems/databases	92%	59%
Complete IT application projects on time and on budget	88%	82%
Expand communication bandwidth	71%	66%
Set systems standards throughout the organization	71%	74%
Increase and justify IT investments	50%	65%
Replace aging or incompatible platforms	42%	68%

Electronic Etiquette Courses Could Help Policy Makers

BY JENNIFER DISABATO

Training on workplace issues such as harassment and violence prevention isn't new. But the proliferation of electronic communication at work has many companies in need of some new rules of the road.

Now, there are digital options for employers and employees to learn the proper way to use e-mail and the Internet at work.

The Electronic Messaging Association in Arlington, Va., announced last week that it's offering a new online tool kit to develop company e-mail privacy policies. And Employment Law Learning Technologies Inc. (ELT) in San Francisco is offering Web-based training on workplace issues, including a course on cyberliability.

Recent legislation on e-mail privacy in the workplace, such as a bill introduced by Sen. Charles E. Schumer (D-N.Y.), is one of several factors pushing companies to protect themselves. The bill would require companies to notify workers when their e-mail, telephone or Internet use is being monitored. Companies would also have to regularly educate employees about such policies.

Last month, Midland, Mich.-based Dow Chemical Co. fired about 50 workers for sending pornographic images through the company's e-mail system, and Whitehouse Station, N.J.-based Merck & Co. reported firings as a result of similarly inappropriate e-mails.

But these companies are hardly alone.

E-mail messages are the best evidence at trials, whether the litigation is over an unfair firing or sexual harassment, said employment law attorney Garry Mathiason, a senior partner at Littler Mendelson PC in San Francisco.

"I can't remember when we did a trial recently where we didn't have a blowup of an e-mail message," he said. Mathiason is also chairman of the board at ELT, which was formed and financed in 1996 by the members of Littler Mendelson. Now, he's in the position of preventing the kind of lawsuits he litigates.

Mathiason said problems stem from the blurred lines between personal and work time. For instance, today, many employees do their grocery shopping online while they're at work.

"The physical separation is evaporating, so we have confusion," Mathiason said. "I think what everybody is striving for is some rules." ■

WORKSTYLES

Mixing Work and Play

The information technology group at Harrah's Entertainment Inc. had been working days and nights for weeks, slaving to meet a tight project deadline, when the familiar music of an ice cream truck rang out. People ran from the office, money in hand, clamoring around the truck to get a midday treat.

Like any other IT group, Memphis-based Harrah's workers are no strangers to hard work. But, said Eileen Cassini, the company's director of IT services, it's important to offer staff opportunities to relax and avoid burning out.

The tight job market is causing many companies to offer their IT employees more frequent and unique benefits to show appreciation for their hard work and dedication.

Christine Hirsch, a principal at Chicago-based Recruiters World, said she's seen it all.

One company she works with relocated the brother and friend of a new hire who recently graduated from college, she said. Another plans to start offering its employees health insurance for their pets.

Connie Pate, a principal at Strategic Associates Inc. in Austin, Texas, spoke of one company that flew all its software development workers and their spouses to Walt Disney World in Orlando for an all-expenses-paid weekend.

Another of Pate's clients has margarita parties every Friday afternoon for its employees.

Thank Y2k

While the tight labor market has had a major impact on the type and level of perks offered to IT workers, another factor was Y2k. As companies frantically competed for talent in preparation for the date change, they began offering better perks than ever, said Barb Gomolski, research director at Gartner Group Inc. in Stamford, Conn.

For instance, Sunnyvale, Calif.-based Intervox Inc. offered new hires brand-new \$37,000 BMW Z3s or the cash equivalent in order to lure workers before the Y2k crunch.

"There are unbelievable demands for companies to hire quality people," said Frank Jones, CEO of Mazescape LLC, a recruiting firm in Stamford, Conn.

Often, companies offer overworked IT employees perks to help them relax and forget about the stress in both their personal and professional lives.

For instance, San Francisco-based Epicentric Inc. has yoga classes, a massage therapist and an on-site concierge service that runs errands such as picking up groceries or getting oil changes for employees.

Epicentric also offers peer counseling workshops and "internships" for employees' children so they can understand where their parents work and why they put in such long hours.

"The IT group can become very, very overworked," said Epicentric CEO Michael Crosno. If a company doesn't offer its IT employees recognition and special perks, they can easily go to other jobs, he added.

Harrah's gives its employees facials to help them relax.

Cassini even hired a maid service for an employee who had been saying that she was going to clean her house as soon as she had a free weekend.

Perks, like health care for pets and free meals, aren't going to keep employees on the job, but if they perceive improvements in their quality of life, they are more likely to remain loyal to their employers, Hirsch said.

Show Me the Money

Cash bonuses still seem to be the most popular perks, according to Hirsch.

But the amounts and types of bonuses are becoming more outrageous, according to Jones, who said he knows of companies that offer bonuses and incentives for employees' spouses.

But material and financial rewards aren't ultimately the reason employees stay at a company, said Gomolski.

"Mobility in the marketplace has really little to do with employees' perks. It has more to do with people looking for better opportunities," she said.

"Do these perks like BMWs work for attraction? Yes, they bring positive attention. [But] ultimately, people stay for a whole lot of reasons aside from perks — they stay for corporate values and challenging work," Gomolski said.

—Meghan Holohan

PAUL A. STRASSMANN

Seeds of arrogance?

INFORMATION TECHNOLOGIES originating in the U.S. are emerging as the engines of global economic growth in the 21st century. This deserves increased attention because IT is becoming one of the primary sources of U.S. economic power. Yet it's quite possible that much of the rapidly surfacing

resentment toward U.S. political dominance in global affairs may, in fact, be a reaction to U.S. primacy in everything related to IT. National anxieties seem to be incited by deep-seated apprehensions that most countries aren't in a good position to compete with computer-intensive U.S. corporations.

Much of history can be read as tales describing the acquisition, holding or loss of economic power. For instance, power conflicts among primitive tribes reflected the battles for control over hunting grounds. Today, it's the possession of and control over information technologies that offer good clues about prevailing shifts in economic power. But any dominance can breed arrogance, and that can erode the IT industry's position in the U.S. Understanding the economic effects of IT is essential as it becomes a global political issue.

The most reliable sources of information about the current status of IT are the published reports of public IT corporations. For 1998 and 1999, I examined the financial results of 2,272 global firms that have been classified as making up the IT sector of the economy. This includes companies that make computers, office equipment, software and electronic components and their accessories, as well as companies that provide IT-related services. Then I examined the firms' profits after taxes. This reveals an organization's capacity to accumulate wealth that can be reinvested. I also included total revenues to show the relative importance of IT in the global and U.S. economies (see chart).

The U.S. companies, with 55.4% of the global revenue, take in 95.9% of all profits. Much of this can be explained by the structure of the IT industry. The U.S. favors a diversified collection of firms consisting of many small and largely profitable corporations. In other countries, the industry is concentrated in large enterprises. These huge firms are relatively poor perform-

ers even though they rack up huge sales figures. A further breakdown of the numbers yields some revealing statistics.

The numbers show that that economic power — in the form of profits — has largely shifted from hardware toward software. But it's also worth noting that Microsoft and Oracle together account for \$9.1 billion in software profits, or 68% of the entire U.S. software industry. Without these two firms, the U.S. position in software would look much weaker.

It's also interesting that, with about half the global computer hardware market (\$303.9 billion), U.S. computer makers report profits (\$15.3 billion) that are greater than the total profits for the entire worldwide hardware industry (\$11.8

billion). So, lumped together, the non-U.S. computer makers actually lost money.

The favorable U.S. results shouldn't be a source of complacency and certainly not a reason to believe the good times will last forever. A study of industrial history shows that staying No. 1 in any market is impossible. The initial cause of decline always comes from self-inflicted wounds, attracting competitors who will assist in the demise of an already wounded leader.

For example, the software industry — our current economic vanguard — has arrogantly leveraged its economic muscle to seek and obtain legal exemptions from accountability for faulty products by promoting the passage of the Uniform Computer Information Transactions Act [News Opinion, April 10].

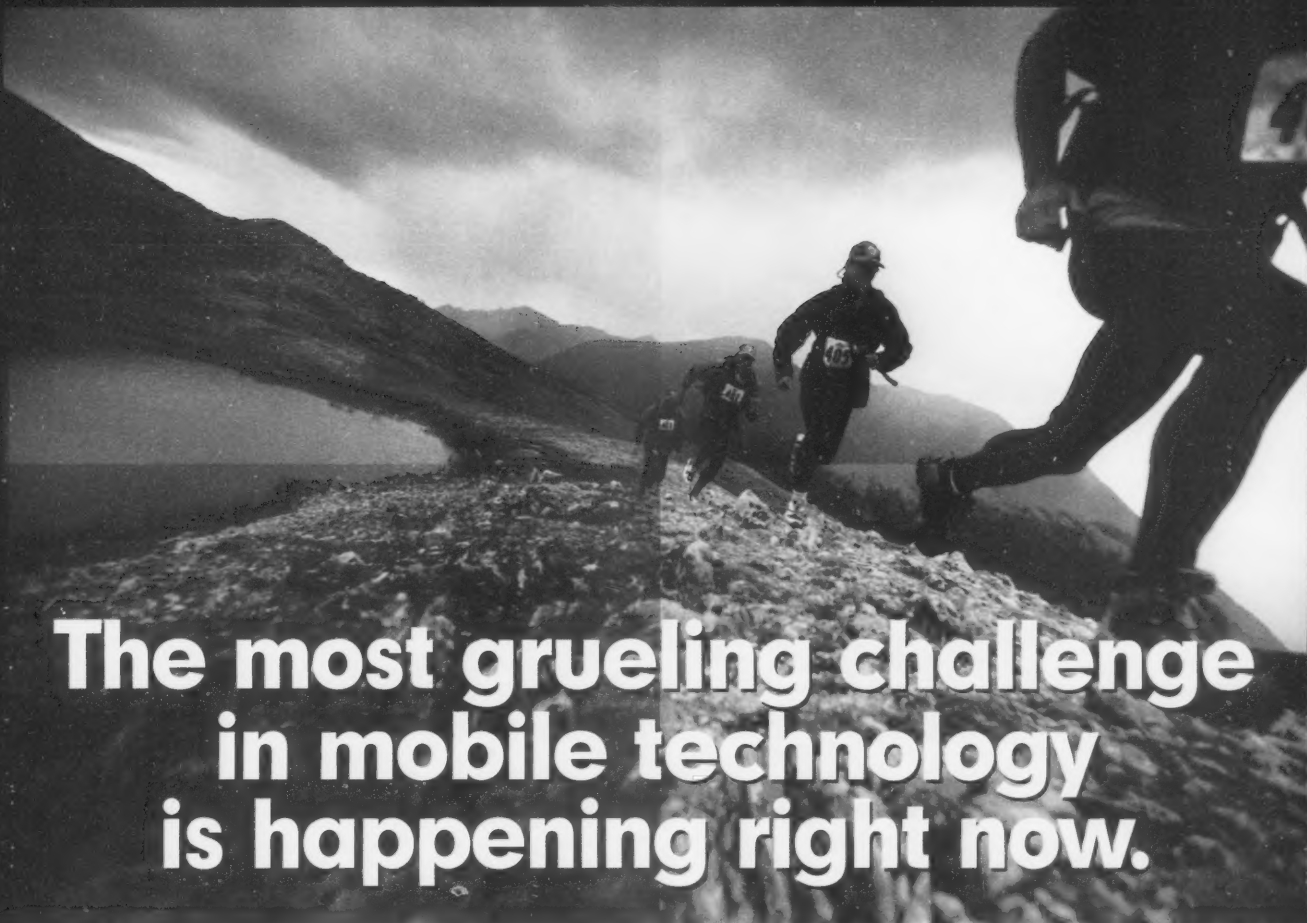
If there's a single cause for anxiety about the continued prosperity of the U.S. IT industry, look no further than the self-serving actions of overconfident companies that will cause global customers to seek other sources of supply. ▀

Strassmann (paul@strassmann.com) has been studying the IT industry since 1985. For supporting data of this analysis, see www.strassmann.com/d2.

*Favorable
U.S. results
shouldn't be
a source of
complacency.*

IT Revenue and Profit

	Number of IT firms	Total revenue (in billions)	Total profits (in billions)
Global	2,272	\$1,153.8	\$379
U.S.	1,568	\$639.2	\$36.3
U.S. share of global total	69%	55.4%	95.9%



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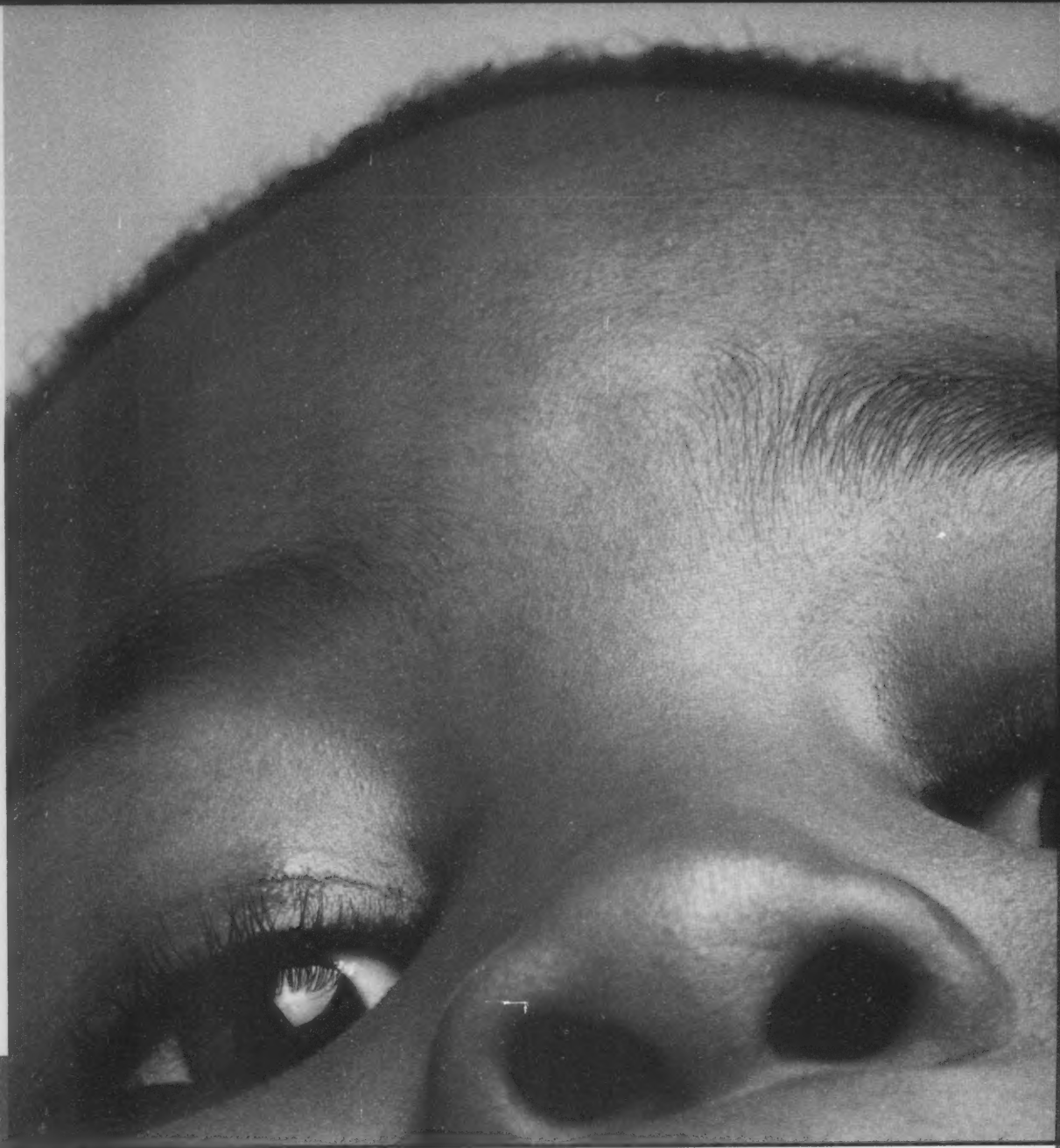
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Application service providers are enabling start-ups to hit the ground running and old-line companies to hand off routine application support and maintenance. But picking a partner with the right business model, capacity and staying power is a high-stakes gamble for many companies.

By Thomas Hoffman and Sarwar Kashmeri

Realistic ASP



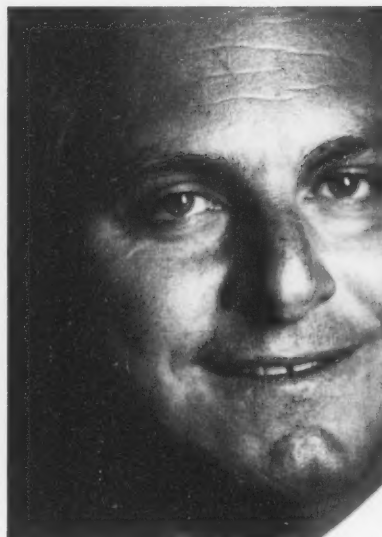
“What we're interested in, obviously, is managing the bottom line.

KEVIN BOOK, SENIOR DIRECTOR OF TECHNOLOGY,
THE MOTLEY FOOL INC.



“Culturally, if you're used to leasing your car, leasing applications is not as big a jump.

SUSAN SWEET, VICE PRESIDENT,
CAP GEMINI ERNST & YOUNG LLC



“The client basically is purchasing the service — not the equipment, not the hardware.

MATTHEW KANTER, PRESIDENT, USI NEW YORK,
USINTERNETWORKING INC.

THE DOT-COM BUBBLE may be gurgling red ink, but that hasn't negated the need among start-up companies to hit the ground running by outsourcing their application support and maintenance to application service providers (ASP). The market for ASPs that handle enterprise resource planning (ERP) applications from companies such as SAP AG and PeopleSoft Inc. is expected to reach \$4.7 billion by 2004, according to AMR Research Inc. in Boston.

But many unanswered questions loom. For example, will ASPs have the capacity and financial wherewithal to handle a potential influx of new business from Fortune 1,000 companies? A roundtable panel

of experts recently spoke with *Computerworld* business features editor Thomas Hoffman and *eBizChronicle.com* Inc. CEO Sarwar Kashmeri about the benefits and challenges of hiring ASPs.

Participants were Matthew D. Kanter, president of USi New York, a division of ASP USInternetworking Inc.; Kevin Book, senior director of technology at USi customer The Motley Fool Inc. in Alexandria, Va., a financial information and services provider; and Susan M. Sweet, a vice president at Big Five consulting firm Cap Gemini Ernst & Young LLC in New York.

HOFFMAN: How do you define what an ASP is?

KANTER: This is one of the most confusing issues in

the ASP world. An ASP is a company that manages and delivers application services to multiple entities across a wide-area network. What that means is, the systems are hosted; the packaged applications are hosted in data centers somewhere and delivered by a [private or public] wide-area network.

The client basically is purchasing the service — not the equipment, not the hardware. And as part of that, they're getting delivery with service-level agreements, guaranteed response and a completely managed service.

BOOK: The snide answer I gave our CEO is it's the Y2k term for IT outsourcing. It allows us to redirect our energies toward our core business. What was valuable was the notion that [USi] would be a single stop for us, a completely responsible entity that would handle all of the application hosting, maintenance, upgrades, connectivity, customer contact, in terms of support — everything down to the help desk functions.

KASHMERI: Was the evolution of ASPs inevitable?

BOOK: Absolutely. Our business started on AOL. We used their message boards, their discussion forums, as the conduit for our community.

We're now a robust IT department of 130 people, but they're all focused on delivering application functionality for our site, not business functionality for our operations. It's the core of how we've been thinking from the beginning.

SWEET: Culturally, if you're used to leasing your car, leasing applications is not as big a jump as it might have been a while ago, when you owned your car and you had something after five years that was rusted and whatnot. It's the same kind of model with applications. You can own it, but after five years, you might not want it anymore.

Impact on Licensing

HOFFMAN: What impact does it have on traditional software licensing models?

SWEET: It moves from a licensing type of an agreement to a subscription pricing agreement.

KANTER: I believe much of this base functionality will become more of a utility, and you'll purchase it based on usage, based on storage, based on a whole series of models. With PeopleSoft, we purchase it for X number of users. I think it definitely will change over the course of time to be more of a pay-by-the-drink approach.

We've purchased the license. Motley Fool has not... What they're doing is paying for the service. They're purchasing a service that's spread out over X number of months. So, in a sense, we created that model where they are paying as they go.

BOOK: From a licensing perspective, it makes almost no difference to us whether we pay fees [to an ASP] or we pay license fees to a software company. What we're interested in, obviously, is managing the bottom line, and we want to make sure that we have the extensibility when we need it.

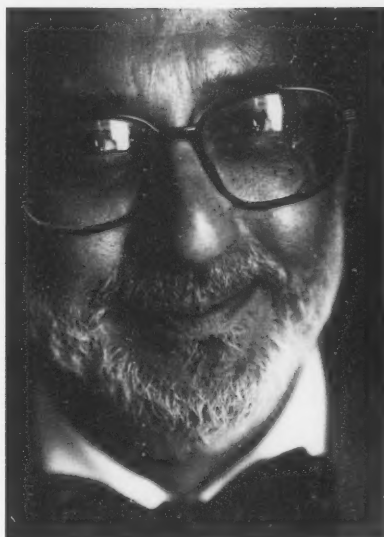
Coming or Going?

HOFFMAN: When does it make sense to use an ASP? When doesn't it?

BOOK: We wanted to buy a polyglot provider; we wanted somebody who would be able to give us expertise beyond PeopleSoft. That was one of the drivers in going with USi.

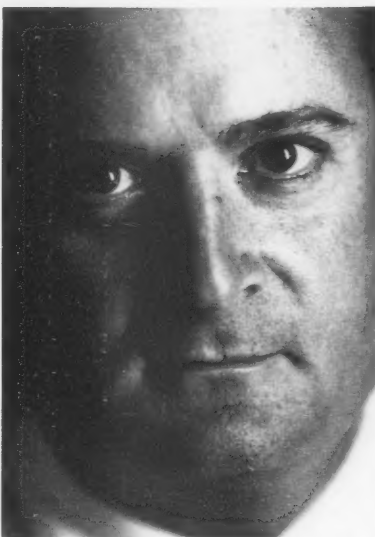
It's the same build-vs.-buy [decision] that we would have asked with any outsourcing arrangement. And that is, "Is it core to us? Are we better at doing this than anyone else?"

inspirations



How do companies resolve customization issues?

MODERATOR SARWAR KASHMERI,
CEO, EBIZCHRONICLE.COM INC.



What are the key challenges that ASP customers face now or will face in the future?

MODERATOR THOMAS HOFFMAN,
BUSINESS FEATURES EDITOR, COMPUTERWORLD

Realistic ASPirations

SWEET: One of the things you get as a client going to an ASP is you don't have to figure out how does SAP interface with Siebel, for example. That's all figured out for you. And because they've done it for X number of customers, you're reducing your risk as a client, because somebody who has to do it six times over and has an uptime agreement with you isn't going to flip that switch until it's ready. So you really get a much cleaner service from someone who's being paid to do that.

The things that are very close to your heart, your brand, you want to stay right on top of.

KANTER: We've definitely gone through some proposal processes where we've just said, "It's just not our sweet spot. There's too much customization. It's an e-commerce application with some really esoteric hooks into things." We'll host it, we'll provide infrastructure for it, but we won't take on support.

For example, we currently don't support any Linux-based applications. What we've done is pick certain strategic areas, best-of-breed applications and platforms. In ERP, we support PeopleSoft and Lawson. In [customer relationship management], that's Siebel. In e-commerce, both Microsoft and BroadVision, and Ariba for procurement.

KASHMERI: Who are the early ASP adopters?

SWEET: It's been the companies that are trying to get off of QuickBooks [financial software for small companies from Intuit Inc.] who have a growth curve in front of them that says, "I can go in the next two years from QuickBooks to Great Plains to Lawson to PeopleSoft and go through this transition four times. Or I could just go to PeopleSoft."

One of the other areas are companies that are spinning off a dot-com division. Rather than having them outsource their application to the mother company, they say, "If you're going to make a go of it, make a go of it on your own," and [they] therefore look to an ASP. **KANTER:** Internet-based companies, B2B companies have been early adopters. Because they saw there was no way for them to build the infrastructures that they needed, [there are] rapid growth companies that outsourced a lot of the other applications to companies like ours.

Future Challenges

HOFFMAN: What are the key challenges that ASP customers face now or will face in the future?

BOOK: If our financial [systems] crash, that's bad. But if the company that hosts our financials disappears entirely from the map, that's very, very bad. And so the stability of the ASP is one of the concerns that we had.

Connectivity through the public network is still something we have occasional problems with — the things that USi doesn't control. There are occasionally some glitches and packets lost and downtime that cannot be ascribed to [USi's] facilities and they don't control for us. So it's the stability of the enterprise and the stability of the connection to the data — those are the two things that we're most concerned with.

SWEET: When you're looking at [an ASP], you want to ask, "How many installs do they have? How long have they been around? How is their financial health?" It's just the normal due diligence that you would do to make sure that they're a viable company.

KANTER: In a lot of cases, you'll find that [ASPs are] not set up to handle [growth]. A lot of [ASPs] took an approach of "We'll hire, we'll staff up, we'll gear up as we need." And I think those companies are going to have a lot of problems. If they suddenly get these large customers, they're not going to be able to keep up with demand. Success will kill a lot of small companies, because they're just not going to be able to keep up with demand.

KASHMERI: How do firms resolve customization issues?

SWEET: You need to tip the box on its side and ask, "How could we configure the package so as to not have to do the customization but to be able to achieve the business objective that you're trying to achieve — that makes it a win for everybody?"

This way, the client doesn't have to pay additional for modifications, [and] the ASP is happy because they don't have to hire people and to train them [to support] the modification.

KANTER: Typically, we'll work with the client and see if the customization is truly necessary or if there's another way to do it, which very often is the case.

But inevitably, there will be some customization. There's a price tag associated with whatever the customization is, and then that rolls forward as part of the monthly application fees. There's a cost/benefit analysis with that.

BOOK: We haven't required much customization. We don't have existing screens and views that an entrenched user of an old system might have in a large company. We have people who are learning these things for the first time.

Moving forward, I expect that we'll find increasingly greater needs for customization, not just with PeopleSoft but as we restructure our company [with more of an] international focus. For example, we may have to deal with the unique needs of a specific marketplace — some esoteric law or tax law that we can't anticipate. If [Motley] Fool Zambia takes off, we may face some [customer] needs we haven't previously thought of.

Buyer Beware

HOFFMAN: What should ASP buyers look out for when procuring services?

BOOK: One area where a lot of companies lack sophistication is understanding the importance of [service-level agreements]. SLAs are one of those things that Internet companies new to the space don't really grasp because, unlike banks and utilities, they're not accustomed to using mainframes [with] guaranteed service availability.

The other [issue] is time-to-market concerns. We spent a long time making very methodical, careful decisions. We did not want to be in a situation where, having selected a vendor of ASP services, we'd have

“The stability of the ASP is one of the concerns that we had.”

KEVIN BOOK, SENIOR DIRECTOR OF TECHNOLOGY, THE MOTLEY FOOL INC.

Roundtable Participants

Kevin Book (thatguy@fool.com), senior director of technology at The Motley Fool Inc., which uses ASP services from USInternetworking Inc. to host its PeopleSoft system
Matthew D. Kanter (matthew.kanter@usi.net), president of USi New York, a division of USInternetworking
Susan M. Sweet (susan.sweet@ey.com), a vice president at Cap Gemini Ernst & Young LLC, a Big Five consulting firm in New York. Cap Gemini has helped corporate customers outsource application support to ASPs.

to wait a long time to market. And so another big driver [behind Motley Fool's selection of] USi was the rapid time to market that they offered. We were able to get up and running really fast [in just 37 days].

SWEET: If you configure your [software] with the foresight of where your business is going, you can do it in such a way that you can end up saying, "Oh, we're going to London? No problem. Just add these things, and we're off and running."

KANTER: The questions you need to ask yourself are: Can you grow with this ASP? Does the ASP have the applications to support the needs now and into the future? Can they deal with customization as you need it and as it's required? Do they have the appropriate security measures in place to protect you, to protect your data, to protect you from hacking and whatever else?

Also, is there a single point of accountability from start to finish? Does that single point mean that no matter what happens across all my applications, it's the ASP's problem? We call it "one neck, one noose." We are accountable; we take total responsibility for everything involved with that application.

KASHMERI: How will the ASP model work globally?

KANTER: What we're doing as a company is structuring our network so that we have the best connectivity from the individual countries which we're attempting to do business in. One of the reasons we're in Amsterdam, not England, currently, is because the connectivity to Amsterdam is better than most areas in Europe. USi is currently developing our international strategy.

Beyond that, you've got a lot of regulatory requirements. For instance, in some countries, HR information can't leave the country; in Switzerland, banking information can't leave the country.

SWEET: I think the ASP concept of leasing your software vs. buying your software is one that will work anywhere in the world.

If [an ASP] has a presence in Europe, that deals with the culture, that deals with the language, the software support, etc. And then there's the second dimension: How well can the ASPs move forward in supporting global companies?

BOOK: One of the things that we think about in terms of expanding globally is having a core group of tech folk and an ASP for the rest.

We've already started to look into how we're going to service the Far East, though we've decided against hiring an ASP for the support. Hawaii might be a better choice [for setting up support operations] because we don't have to worry about shipping things overseas across customs.

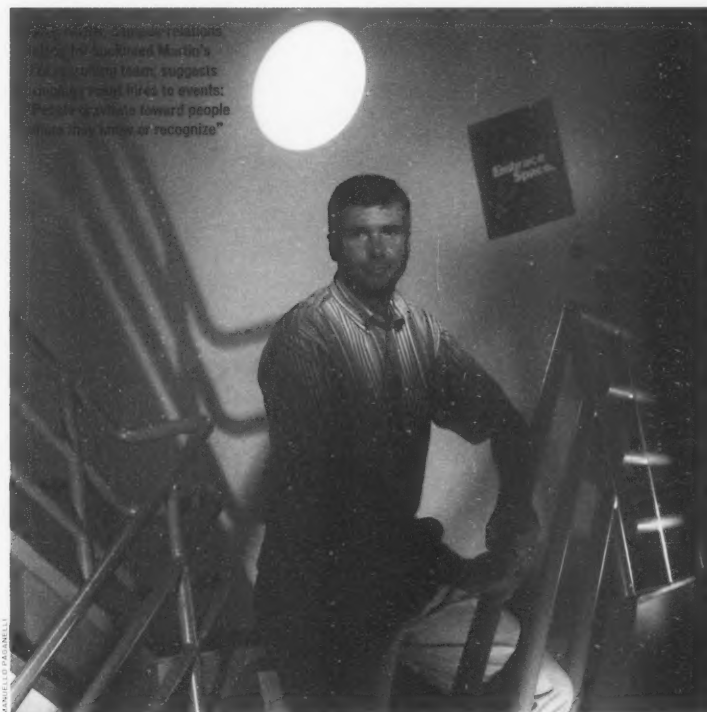
KANTER: It won't be difficult to staff it. [Laughter.]

BOOK: That's certainly true. ■

This roundtable was a joint effort by Computerworld and eBizChronicle.com Inc., an online daily news service on e-commerce (www.ebizchronicle.com).

Lockheed Martin Taps Into 'Hire' Learning

Landing up-and-coming IT talent from universities requires more than just a campus appearance on career day. Lockheed Martin attracts graduates from the University of Virginia by offering exciting projects, sending guest lecturers to classrooms and showing students new technology that the company uses. By Julekha Dash



COMPANIES HAVE long tapped into leading universities for top-notch talent. But these days, it's a mistake for firms to think that simply speaking at career days and posting job openings on campus are enough to make an impression on information technology students, says Don Brown, professor and chairman of the systems engineering department at the University of Virginia

(UVA) in Charlottesville.

As companies ranging from Internet start-ups to consulting firms offer recent graduates challenging work and big paychecks, more traditional companies have a tougher sell, says Brown.

For example, one chemical manufacturing firm has been wondering why it hasn't recruited a single UVA student in recent years. "They're coming in with brochures, talking during career days, but [students]

can't see the work that's going on" inside the company, says Brown.

But that isn't the case with aerospace and government contractor Lockheed Martin Corp. The Bethesda, Md.-based company sponsors student-led technology projects, sends speakers into classrooms and provides input into the curriculum at the master's degree level at UVA.

"All those things make a big difference," Brown says.

Lockheed hired 18 graduate and undergraduate students out of about 400 in UVA's School of Engineering and Applied Science's class of 2000.

Getting Face Time

Companies that want to attract top students need to have an active presence on campus year-round, says Mike Barbee, a vice president and university executive on the UVA recruiting team at Lockheed Martin.

"Students get to know us in various forms rather than purely for recruitment," Barbee says. "They can go anywhere they want. Corporations that care about them are the ones that they will lean toward when it comes to making a final decision, because we're there talking face to face [to students] about technology."

Someone from the company spends time at the university at least once each quarter, says Barbee.

Lockheed Martin typically brings recent UVA hires to events because "people gravitate toward people whom they know or recognize," says Dave Kohn, a campus-relations liaison for Lockheed's UVA recruiting team. "Bringing food always helps," he adds.

A company is more likely to capture students' interest if its presentations are interactive or include demonstrations of how the firm uses technology.

For example, one popular Lockheed presentation involved "engineering ethics" training for fourth-year students taking a required technology, culture and communication class, says Kohn. Students were presented with dilemmas that didn't necessarily have clear-cut answers.

Students were asked questions such as, "What would you do if a program manager pressured you to stop testing lab equipment because of deadline pressure?" The training gave Lockheed Martin employees an opportunity to interact with students and get

them to think about how their learning has real-world implications, says Kohn.

Setting the Course

In addition, Lockheed Martin sponsored two student projects this year: One involved creating a business-control function for the company's naval electronics and surveillance systems, and the other involved the creation of a virtual distribution center.

Teams of four or five students worked on the projects with Lockheed Martin advisers and UVA faculty members, says Kohn. Students were responsible for defining the requirements of the project, implementing the solution and presenting the final results.

For Lockheed Martin, sponsoring such projects offers an opportunity to let students meet employees and see how the company uses technology, Brown says.

"Students not only get to experience a real project, but they get to know what we do, our people and our culture," says Vicki Staton, program manager for Lockheed Martin's UVA recruiting team.

Because students have so many job choices these days, firms "need to convince students that they're doing exciting work," Brown says. ■

AT A GLANCE

Lockheed Martin

Industries: Aerospace, telecommunications and government services

Employees: 149,000 worldwide

Operations: 939 facilities in 43 states and 56 nations and territories

Headquarters: Bethesda, Md.

Lockheed Martin's partnership with the University of Virginia (UVA) includes the following components:

1. Funds design projects for seniors
2. Sends speakers, who lecture in classrooms as well, to major student organizations
3. Presents interesting and challenging technology projects to students
4. Meets with key college department heads every couple of months
5. Influences systems engineering curriculum at the master's degree level
6. Brings Lockheed Martin employees who are recent UVA graduates to recruiting events
7. Shares best practices among various college relations teams

SUN iFORCE™ PROVIDER IT

Intelligent Solutions is a breath of fresh air for Oxygen Media

T.V. ad during the Super Bowl promised Oxygen Media many hits

Intelligent Solutions needed to move fast. Its client, Oxygen Media — the first television and online network for women — had funding, high-roller backers and a nonnegotiable deadline. Intelligent Solutions had to consolidate a mish-mosh of Internet service providers (ISP) into a unified, bulletproof infrastructure that could handle the sky-high demand that was sure to hit as a result of an aggressive ad campaign — including a Super Bowl TV spot. Which, by the way, was less than two months away.

THE WISH LIST

According to experts, most IT integrators would have required 30

to 45 days for planning alone. This was a luxury Medford, Mass.-based Intelligent Solutions Inc. (www.intel-sol.com) did not have. Here's the list of Oxygen Media (www.oxygen.com) must-haves that faced Kevin Metcalfe, Intelligent Solutions' managing partner, and his team:

- Create a new Web infrastructure that could support millions of hits every day.
- Migrate 22 sites that resided at four ISPs.
- Manage and collaborate with several other vendors, including the co-location facility, a Web-software migration specialist and a Windows NT integrator.
- Do all this in 52 days.

Through teamwork, hard work and smart work, Intelligent Solutions, a Sun iForce Partner, got the job done.

Part of Intelligent Solutions' challenge rose from the people behind Oxygen Media. The company was created by Oprah Winfrey, Geraldine Laybourne (a Nick-elodeon and Nick at Nite kingpin), and the principals of the Carsey-Werner-Mandabach Co., the Hollywood production company behind such TV shows as Roseanne, Grace Under Fire and Third Rock from the Sun, among other hits. The founders' credentials make it no surprise that Oxygen Media secured \$122 million in financing and rapidly built or bought an impres-

sive portfolio of sites, including Moms Online, SheCommerce, WeSweat and Breakup Girl.

The media powerhouses behind Oxygen Media were used to getting results — fast. They finalized plans to launch the television component in November 1999; nailed down funding a month later; and began an advertising campaign that would introduce the U.S. to Oxygen Media. The campaign, it was decided, would build to a TV ad that would run during half-time of Super Bowl XXXIII — which was less than two months away!

Success rested on the shoulders of Steve Bey, Oxygen Media's director of information systems. Starting with a crazy-quilt of Web sites, he had to create a unified infrastructure that could handle the

FusionStorm helping HomeNotHome.com get to the Web

HomeNotHome was trying to build its Web site, but needed help

Homeowners who've tried to run the show when they finished a basement or built an addition understand the frustrations and pitfalls of acting as your own general contractor. So it's easy to sympathize with HomeNotHome.com, a Hong Kong-based e-business. The company was trying to design, build and launch its first Web site on its own — while at the same time growing a global organization. It's no surprise that the chore eventually became too daunting to handle in-house.

HomeNotHome.com was launched by Americans living in Hong Kong. The group wished for an easy way to both learn more

about the local environs — vital yet hard-to-come-by data such as where to find a babysitter, who to contact to get your lawn mowed, how to contact other U.S. citizens in the area — and to stay connected to U.S. happenings.

Sound like a great candidate for a Web business? The expatriate Americans thought so, too. They developed a business plan, found investors in Hong Kong — and thus was born HomeNotHome.com.

Soon, the company ran into trouble. The founders had hoped to capitalize on inexpensive local programmers to save money on site development. But HomeNotHome.com experienced the Achilles' Heel of this cheap off-

shore programming, according to Jann Roney, vice-president of Web development at San Francisco-

based FusionStorm, a Sun Microsystems channel partner:

"There's plenty of programming talent overseas, but there's not a lot of project-management expertise, so the programmers sometimes do a lot of good work — that goes off in the wrong direction."

HomeNotHome.com had promised investors a Web site by December 1999. "In a tight spot," Roney says, the company contacted FusionStorm (www.fusionstorm.com) in October.

Founded as Synergistic Computer Solutions in 1995, FusionStorm has built IT and Web infrastruc-



tures for more than 1,000 companies. The remote managed services company specializes in delivering strategic technology solutions for emerging and mid-size companies. FusionStorm helps keep systems running smoothly 24x7 so companies can focus on their business.

Its managed services provide monitoring and management of complex, high-end enterprise solutions. FusionStorm's professional services and database consulting services include architecture and design, configuration, deployment, database and co-location.

FusionStorm spun off its Web development team to create a new company called Yotekai.com to provide increased flexibility on projects, client focus and market identity.

FusionStorm has long had a strategic relationship with many

LEADER PROGRAM

traffic load the Super Bowl spot would generate. He had to move fast — even by Internet standards.

Fortunately, Bey had worked with Intelligent Solutions before. He called Kevin Metcalfe.

Metcalfe hardly batted a lash when he heard the timetable. "We knew it was aggressive," he says, "but these people paid \$2.5 million for an ad, and you can't call the NFL and ask to push the Super Bowl back a week. So we put our heads down and got it done."

So a seven-member Intelligent Solutions team went into action. Selecting the host was an early challenge. The nod went to Boston-based HarvardNet (www.harvardnet.com). One rea-

son: "They're the only guys on the east coast [connected to] two redundant power grids," Metcalfe says. In Oxygen Media's setup, each Sun Microsystems 220 server is connected to two uninterruptible power supplies, each hooks to

a separate commercial grid. Thus, even a wiped-out power grid would not take down Oxygen Media. This belt-and-suspenders approach demonstrates Intelligent Solutions' awareness of the

importance of uptime.

Metcalfe points out that there was a lot more to the migration than just "stacking and racking" — though, with more than 30 Sun Microsystems servers ("We're Unix bigots," he says) and 26 Windows

NT servers for the sites Oxygen Media purchased that couldn't be ported to Unix, there was plenty of that as well. Intelligent Solutions worked with over 120 Oxygen Media people at various sites, each of whom had unique concerns and issues.

THE FINAL RESULTS

In the end, the hard work paid off. On Super Bowl Sunday, the ad ran as scheduled — and Oxygen.com saw 1.8 million hits in an hour (compared to an average of 150 per hour before the ad). The new infrastructure handled the load flawlessly. How's that for scaling quickly? Today, the site sees 8 million to 10 million hits per day. "It was a beautiful thing," says Bey, "and Intelligent Solutions made it happen."

"These people paid \$2.5 million for an ad, and you can't call the NFL and ask to push the Super Bowl back a week. So we put our heads down and got it done."

— Kevin Metcalfe, managing partner
Intelligent Solutions

technology leaders, including Sun, Oracle Corp., Cisco Systems Inc. and Hewlett-Packard Co. With demand growing, the company now boasts five offices in California and one in Boston.

When it first contacted FusionStorm, HomeNotHome.com was in need of consulting to find out why its project was straying. The company was "struggling with the overall architecture of the site," Roney says. "They had the site hosted in Hong Kong and found — even though they weren't live yet — a lot of problems with uptime." The initial contract called for FusionStorm to study HomeNotHome.com and "truly architect the site — see what was missing," Roney says.

An engineer was dispatched to Hong Kong. He made an initial evaluation, which FusionStorm followed with recommendations. To increase uptime and reliability, the company recommended that

The Award Program

The Computerworld Custom Publishing and Sun Microsystems sponsored contest recognizes innovative Sun implementations around the world. End users were invited to submit their Sun "channel provider-developed" implementations. The winners were chosen by IDC based on the uniqueness of the solution and its value to the host organization. The winners' stories appear in Computerworld during July and August and online at www.Computerworld.com

HomeNotHome.com make a switch and host the site in the U.S. Moreover, FusionStorm believed it was important to use a carrier-class host facility.

HomeNotHome.com adopted these recommendations. The Hong Kong company decided to make use of FusionStorm's managed services. According to Frank Sayers, vice-president of solution services at FusionStorm, "Since we ar-

chitect [a project] and implement it and get it in a [co-location facility], they wanted us to help manage it, too."

"We've got 24x7 monitoring so if there's any problem, we get an alert. We determine what the problem is and try to fix it remotely." If the problem must be addressed locally, Sayers adds, FusionStorm dispatches someone.

Despite issues revolving around time differences, ("At first, I got calls at 3:00 or 4:00 in the morning," Sayers jokes), HomeNotHome.com and FusionStorm co-managed the project, which came in on time. HomeNotHome.com runs a Sun Ultra 5 server that uses Oracle 8i on the back end. The site is such a success that HomeNotHome.com is building a worldwide presence, addressing the needs of expatriates in other Asian countries with an eye toward a truly global site.

COMPUTERWORLD
CUSTOM PUBLISHING

The Value of Certification

Situated between the manufacturer and the end-user customer, channel partners are continually evolving their business models to ensure that they stay competitive in the fast-paced IT industry. To accomplish this, channel partners need to have a solid understanding of the technology on which they are building the solution, and customers need to know that the partner has the expertise. These solutions are often mission-critical and must be implemented in Internet time.

Supplier certification programs are designed to provide the partner the knowledge required to effectively work with the products. Successful completion of a certification program often allows the channel partner a higher level relationship with the supplier, because some suppliers allow only those that successfully completed certification access to the equipment. Certified partners are also recognized by the supplier as those that have made a commitment to the vendor. They may be the only partners allowed additional benefits such as leads, access to engineering or resources such as demo equipment, and inclusion or access to marketing programs.

While certification is costly to the partner, the benefits can outweigh the costs because it provides the customer a seal of approval. The supplier should have confidence in the partner, and the partner should make a clear commitment to the vendor.

With the introduction of specialized certification programs, channel partners can provide more in-depth training. This translates to added revenue as the solutions tend to be more complex. With the right training, the channel partner can increase their time to delivery and their value-add services.

But the benefits extend beyond just the program and commitment levels. A recent IDC study of end-user channel preferences shows the primary reason for dissatisfaction with their channel was lack of service and support. Through vehicles such as certification, the channel partner is equipped to provide the level of service and support required, allowing a higher customer retention and providing a win-win scenario for the channel, the supplier and the customer.

 **IDC**
INTERNATIONAL DATA CORPORATION

A year ago, dot-coms were the hiring rage, as they heaped tons of riches and stock options on IT workers. Now, they hide their dot-com identities, for fear of driving candidates away. By Claire Tristram

TO DOT-COM OR NOT? A Silicon Valley job seeker with the kind of résumé any dot-com company would drool over keeps having the same conversation at the companies he's considering.

"Every interviewer keeps telling me, 'We're not a dot-com company — we have real technology!'" he says. "No one wants to be 'a dot-com company' anymore because they won't find anyone who wants to work there."

What a difference a year makes.

Last year, even in the midst of record-low unemployment and a shortage of technical talent, the dot-coms got away with offering rock-bottom salaries in exchange for a tiny slice of equity. The most unlikely of business plans — say, selling pet food over the Web — suddenly seemed like sure winners. Employees began to expect nine months of working like crazy, followed by an initial public offering (IPO), followed by induction into the ranks of Internet billionaires.

With dot-com burnouts blazing across the Internet like a meteor shower, many dot-com companies are struggling to find the talent they need. (For a daily recap of the recently fallen, check out www.dotcomfailures.com, an

ever-gleeful Web site with the tag line "Kick 'em while they're down.")

Some are even trying cosmetic makeovers to hide their dot-comness: Where companies used to trademark the "dot-com" into their names, now many are busy erasing all overt mention of the Web: In just the past few weeks, Shopnow.com changed its name to Network Commerce Inc., Stockup.com became Preference Technologies Inc. and JFax.com Inc. became j2 Global Communications. And there are many more examples.

Even blue-chip companies like Amazon.com Inc., eBay Inc. and Yahoo Inc. have been hit hard by the sea change, with stocks taking a 50% plummet this spring. In June, Yahoo became desperate enough to hold a pep rally/open house to attract new talent, complete with rotating presentations by "Chief Yahoo" David Filo and Chief Scientist Udi Manber. In pre-IPO years, Filo and Manber hadn't needed to beat the bushes.

Did it work in getting more engineers to sign on? "That isn't something we care to comment on," says Yahoo spokeswoman Lauren Strain. But it's nevertheless clear that being what industry analysts like to call a "pure In-

ternet play" is now making it all the more difficult to fill vacancies.

"Every Internet company I've spoken with is trying to hire a hundred people," says one job-hunting engineer. "There just aren't a hundred people out there for every dot-com with a new idea."

What does it all mean to prospective job seekers? Is it time to head for the Fortune 500 and leave Internet start-ups to flounder without you?

Not quite. But current events require information technology professionals to adopt new strategies before going dot-com.

"We're out of that euphoric era, when you could go public with a lot of arm-waving and end up wealthy," says Gary Fernandes, who nevertheless recently left a management career at Plano, Texas-based Electronic Data Systems Corp. to become chairman and CEO of Dallas-based GroceryWorks.com. "But the Internet is still the future. There are still huge opportunities for people who know how to spot business opportunities and how to manage cash flow."

Don Ledwick, a recruiter at San Jose-based Professional Search Associates, recommends that job hunters act like venture capitalists and evaluate a prospective employer's business plan. This means not just looking at the job itself, but also taking stock of how experienced the leaders are, what level of competition the company faces, how deep its pockets are and whether the company has any unique value to bring to the market beyond an advertising campaign.

The Shame of DOT-COM

Stock market volatility has accelerated job volatility — both in terms of layoffs and people walking away from failing ventures. That's why it's critical to know before you sign on how successful the company has been in attracting new talent, and how quickly. Smart employees also need to cut ties and try elsewhere at the first sign of trouble, to leave before layoffs ever hit.

"There's a tendency to work vigorously to save a dying company, rather than to leave when the going is still good," says Ledwick. "That's a mistake. If the company isn't making it, then change jobs. In this industry, you need

to be acclimated to the idea of leaving fast if you need to. It's OK to have two or three start-ups on your résumé in the last five years. You won't be downgraded, especially if you interview well."

Job seekers also need to wake up to the fact that they may not need to trade salary for an equity stake any longer — they can negotiate vigorously for both. Tom Call, a technical recruiter at Menlo Park, Calif.-based RHI Consulting, an IT placement firm, estimates that every good candidate his company works with will have as many as nine solid job offers. That makes for a lot of negotiating power, especially in

an era of waning stock valuations.

"Overall, I've seen job hunters successfully saying, 'Yes, I'm interested in equity, but give me a good salary, too,'" he says. "The dot-coms are realizing they have to pay the market rate on salaries, with the market as volatile as it is. It's always a risk when you're counting on a good portion of your payback to be in options. Most dot-coms won't be around long enough for their employees to get fully vested. For the most part, candidates are more educated now and less willing to deal."

Tristram is a freelance writer in San Jose.

Inside the Dot-Com Culture

So, what's it really like to work at a dot-com?

For years now, you've heard about the long hours, the relaxed dress code, the cots in the hallways, the shower in the basement and the so-called perks, such as being able to bring your dog to work so you don't have to feel bad about never being home to walk it. But deciding if an Internet start-up is right for you means thinking about much more than that.

Dot-coms have been laying people off and going out of business all along, even if you've read about it in the press only recently. So the first thing you need to consider is your appetite for risk.

Ask **Dan Bergkamp**, who, after due diligence, joined a successful dot-com only to find himself out of a job four months later when the company laid off its entire customer service department. He nevertheless looks upon that four months as a great experience and harbors no ill will toward the company.

"I went in not knowing if I would succeed in that environment, and I came out knowing I could," he says. "They paid me fairly. I learned a lot. So I took what I could from that experience and moved on."

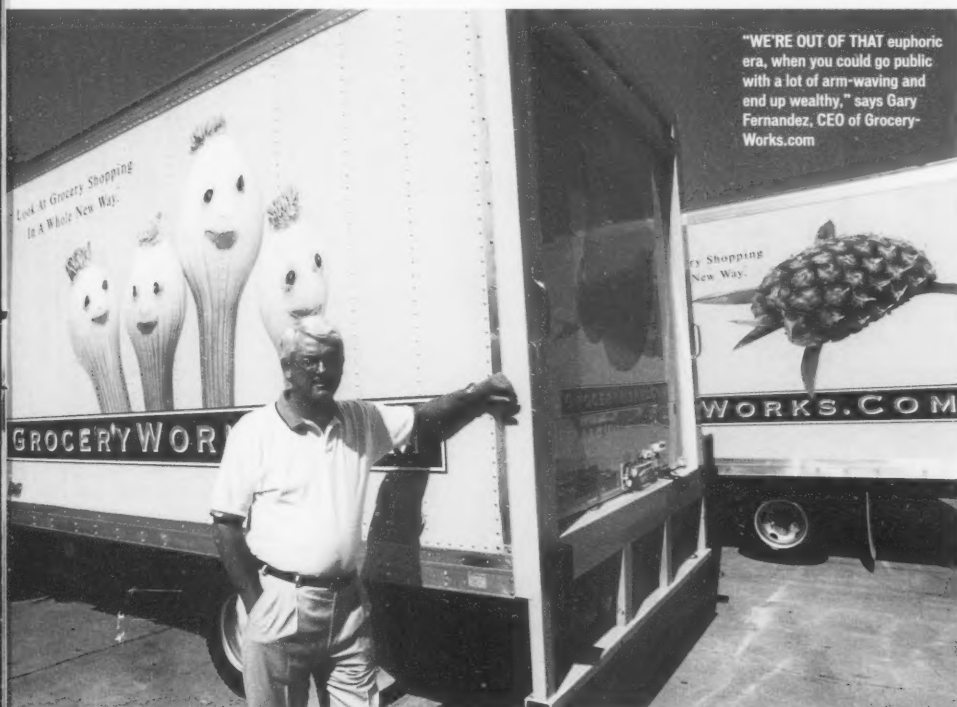
Working at a dot-com also means you need to perform at your peak all the time — because everyone is watching you. Leave at 6 p.m. instead of 11 p.m., even if you're done for the day, and you risk having people say you just don't fit in.

"There is almost a day-to-day assessment of the investment in human capital," says **C. Bret Martin**, a recent veteran of three start-ups who now works at Sun Microsystems Inc. "Everyone is snooping into your business, wanting to make sure you're doing your job today. And if things start to go bad, everyone is looking to assign blame in short order."

Martin nevertheless says, "Start-ups are great! It's exciting stuff, particularly if you like uncharted territory and living the life of entropy. A start-up can create a sense of family, where you're emotionally tied to one another. You work together, then you ski together and golf together. You begin to feel tremendously close, so much so that if the company can keep meeting its payments, it's enough for you to put up with a lot."

Both Martin and Bergkamp say they agree that no one can live the dot-com life forever. Bergkamp, who has two small children, is considering joining a more established company like San Jose-based Cisco Systems Inc., which has offered its employees both stability and spectacular stock growth in the past few years.

Martin has joined a new business unit at Sun that he says offers the autonomy and excitement of a start-up, with the added advantages of health benefits, a relatively relaxing 55-hour workweek and a paycheck he can count on to not bounce. — *Claire Tristram*



COMS

Hiring the Invisible Workforce

Information technology workers with disabilities remain one of the most overlooked segments of the workforce. But when someone is seated in front of a computer and communicating through a Web site, a wheelchair, a cane or a hearing aide becomes invisible. That's why the IT field is such a nice fit for people with disabilities, says Richard Dodds, a 20-year veteran of IT and director of technology at Community Options Inc., a national nonprofit group that provides employment and residential services for people with disabilities. "Communication of ideas, and not communication of body language — that is the key of this whole thing," Dodds says. "Get beyond the minutiae." In a recent interview with Computerworld's Melissa Solomon, he spoke about benefits workers with disabilities have to offer and how IT employers can help accommodate them on the job.

What are some ways employers can accommodate IT workers with disabilities? First, every individual is just that, an individual, so what might work for one person might not work for another. Using technology, virtually everyone can succeed at doing the job in the workplace. What most people fail at is the social side of their job. Typically, when it comes to employing people with disabilities, the very basics that employers need to know [are] No. 1, they need to interview people based on their skills, not on what they look like or what they sound like and if they come in in a wheelchair. . . . Ask questions via e-mail before [job candidates] come in.

Then, if you figure out that "this person's got the skill set we want" . . . you can't ask them at the very beginning, "Well, what's your disability, and what do I have to do to accommodate that?" That's patently illegal. The Americans With Disabilities Act [ADA] prevents you from doing that. But what you can do is say, "We're making you a job offer; is there anything else we need to know about you? Any particular accommodations we need to know so we can have this job all set up correctly for you?"

What are some common accommodations for IT workers?

Many accommodations are discovered as the job goes on. It's very difficult for anyone who hasn't done the job yet to say, "Gosh, I've just done the



WHO IS HE?

Richard Dodds, 40, is director of technology services at Princeton, N.J.-based Community Options Inc. He previously served as director of rehabilitation technology at the United Cerebral Palsy Association for 13 years and has worked with Microsoft Corp. to design software tools that can help ensure that people with disabilities can be included in the workplace.

interview and I think I'm going to need X, Y and Z." The majority of job-site accommodations that are done in this country — I think it's 80% — cost less than \$500. . . . Many accommodations [don't cost anything]. Often, it's, "Can you move a filing cabinet?" Even some of the things that were expensive five to six years ago are inexpensive [now]. . . . Voice input technology, the top-of-the-line systems now, you can go to OfficeMax or Staples and purchase for less than \$300. And on top of all this, you can request that [your state's] division of vocation rehabilitation purchase that access tool for the individual. As you can well imagine, a state system is probably not that speedy. . . . So, if you're employing somebody, you don't want to wait a month to get a piece of technology.

Where can employers find tips on saving money on workplace accommodations? The Job Accommodation Network [www.jan.wvu.edu]. . . . But before you go to these big, national resources, ask the person who's asking for the accommodation how they've seen it done or how they would like it done. Because often, they know the least expensive, most efficient way of getting it done.

Are there steps employers need to take to protect themselves legally if they need to fire an IT staffer with a disability? The key here is you should not be afraid to fire somebody because they have a disability. If you provide them with reasonable accommodations and they don't perform . . . you give them that opportunity, and it's up to them to succeed or fail. If you hold one group to a lesser standard, that's obvious discrimination. ADA is about civil rights . . . It's not about quotas.

What about sensitivity issues? Should, for instance, employers alter their management style for IT staffers with disabilities? I would incorporate that into the general sensitivity training or diversity in the workforce training that is done all over the place. If it's done in an isolated way, then it can actually backfire. Because then people are hypersensitive. It's more about getting to know individuals than this blanket [statement], "All people with disabilities you should talk loud to, or open the door for or offer to help." I think people should start to think, "How about me? How would I like to be treated in that situation?"

Should companies form disability commissions or committees? If you're a company that already employs people with disabilities, if you have a planning committee or any kind of building you're doing [or] if you have a human resource committee . . . you want those folks on committees.

With today's job market, many employers try to reach out to untapped populations. Are there services that can help companies recruit IT workers with disabilities? There isn't the disabled workers' want ads . . . [but] every state in this nation has independent living centers — United Cerebral Palsy, the Association of Retarded Citizens, Easter Seals, vocation rehabilitation. So without saying, "I'm looking to hire people with disabilities," you could say, "Hello voc rehab, we're looking to hire people; these are the jobs we have open. Do you have anybody?" [There's also] the President's Committee on Employment of People with Disabilities [www50.pcep.gov/pcep]. ■



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Summer Reading For Career Builders

Primers on everything from striking out on your own to getting along with your boss

Successful Independent Consulting: Turn Your Career Experience Into a Consulting Business, by Douglas Florzak

A helpful how-to book aimed at helping you make the transition from employee to self-employed. Includes information about creating a business plan and internet marketing strategies. (Logical Directions Inc., 1999; 214 pages, paperback; \$19.95)

Consulting Demons: Inside the Unscrupulous World of Global Corporate Consulting, by Lewis Pinault

A candid narrative of what it's like to lead the life of a management consultant and how the dream can go wrong. (HarperBusiness, 2000; 284 pages, hardcover; \$26)

Managing Up: 59 Ways to Build a Career-Advancing Relationship With Your Boss, by Michael S. Dobson and Deborah Singer Dobson. Besides providing information on improving your relationship with your boss, this book can also aid you in moving up in the management ranks. (Amacom Books, 1999; 176 pages, paperback; \$16.95)

Get Certified & Get Ahead, by Anne Martinez. This book provides information to help you find and ob-

tain the right credentials. It gives explanations of more than 400 current certification programs. (McGraw-Hill, 2000; 656 pages, paperback; \$24)

Career Choice, Change & Challenge, by Deb Coen and Tony Lee

Professional guidance for job-seekers and career-changers. Includes proven techniques for networking, writing a résumé, interviewing and negotiating salary. (Jist Works, 2000; 224 pages, paperback; \$15.95)

Flawless Consulting: A Guide to Getting Your Expertise Used, by Peter Block

This book gives helpful advice to information technology consultants on how to deal effectively with clients and peers. It also gives case study examples of how you can become a consultant. (Jossey-Bass, 2000; 240 pages, hardcover; \$35)

Artful Persuasion: How to Command Attention, Change Minds and Influence People, by Harry A. Mills

Explains the mystery of the psychology of influence and reveals tactics to help you with persuasion. Useful for technologists honing their communications skills. (Amacom Books, 2000; 240 pages, paperback; \$17.95)

The Fearless Executive, by Alan Downs. Find out how to overcome the fears that hold you back from succeeding in a competitive workplace, as well as negative thinking. (Amacom Books, 2000; 212 pages, hardcover; \$22.95)

Best Jobs for the 21st Century, by Ronald L. Krannich and Caryl Rae Krannich. This book provides more than 50 lists of the best jobs for the new century, including many in IT. Includes starting pay, growth potential and demand. Also provides descriptions for 686 different jobs. (Impact Publications, 1999; 328 pages, paperback; \$16.95)

The Complete Guide to Home Business, by Robert Spiegel. This book provides information for IT telecomputers and contractors on how to run the perfect home business, from planning your start-up to marketing your business. (Amacom Books, 2000; 320 pages, paperback; \$19.95)

24 Hour MBA, by Alexander Hiam

Includes five main courses and four short courses to help you develop the skills you need to succeed, especially in a business-technology role. (Adams Media Corp., 2000; 352 pages, paperback; \$17.95)

Internet Jobs, by John Kador. An insider's guide to landing the perfect internet job. It gives information on the technical and business skills employers demand. It also offers details about hours and pacing on the job. (McGraw-Hill Professional Publishing, 2000; 184 pages, paperback; \$16.95)

The Value-Creating Consultant: How to Build and Sustain Lasting Client Relationships, by Ron A. Carucci and Toby J. Tetenbaum. This book tells IT consultants what bad habits and behaviors to avoid. (Amacom Books, 1999; 285 pages, hardcover; \$25)

Games Companies Play: The Job Hunter's Guide to Playing Smart & Winning Big in the High-Stakes Hiring Game, by Pierre Mornell

This book gives information to help you become interview-savvy. Includes information about con-

ducting preinterview research, mastering e-mail, taking cues from an interviewer's style and salvaging a bad interview. (Ten Speed Press, 2000; 192 pages, hardcover; \$24.95)

Ace the Technical Interview, by Michael Rothstein

This book provides answers to some questions that technical employers want to know, and aims to help you find the position you want — and get it fast. (Computing McGraw-Hill, 1998; 400 pages, paperback; \$24.95)

The Consultant's Legal Guide: A Business of Consulting Resource, by Elaine Biech and Linda Byars Swindling

This legal guide aims to help consultants understand basic legal terms, negotiate better agreements, protect intellectual property and control legal costs, especially helpful for independent IT consultants. (Jossey-Bass, 2000; 320 pages, hardcover; \$49.95)

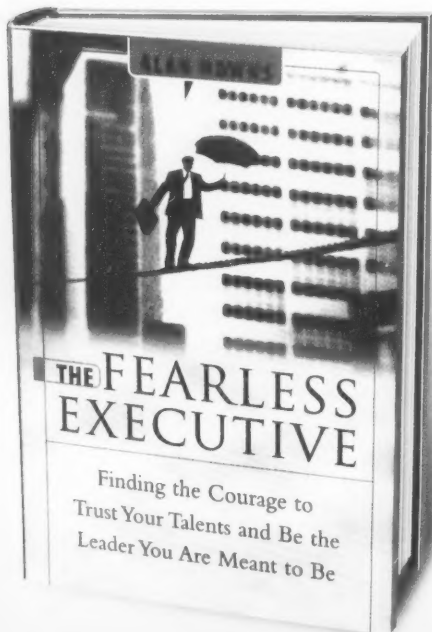
Pay People Right, by Patricia K. Zingheim and Jay R. Schuster

This book explains how companies can create a more productive workforce by changing the methods by which employees are compensated, especially in the rapidly escalating IT pay scale. (Jossey-Bass, 2000; 388 pages, hardcover; \$34.95)

The Harvard Business School Guide to Finding Your Next Job, by Robert S. Gardella

This book offers a road map for planning and conducting a search for the perfect job. It covers writing résumés and how to stay motivated during a job search. (Harvard Business School Press, 2000; 176 pages, paperback; \$16.95)

Reviewed by editorial intern Meghan Holohan.





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E-Commerce Benchmarking

BY TAMARA WIEDER

WHEN I'VE ALL used benchmarks — those handy points of reference from which we measure or judge our personal and professional successes. And in the business world, benchmarking has long been a useful evaluation tool. After all, you simply can't know how well your company is doing unless you have something you can compare it with.

But the advent of the Internet age has produced a whole new way of doing business. When companies first began to make their transitions to the Web, their main concern was getting their operations up and running.

Once that has been accomplished, e-commerce operations need a system to measure whether they're meeting their goals and to see how their performance compares with that of competitors. Traditional business benchmarks won't work because they're based on entirely different core processes.

Know Your Goal

"It's useful to understand where you want to go," says Steve Johnson, co-director of the e-commerce program at Andersen Consulting in Chicago. Organizations need to "find target audiences that [they're] trying to communicate with... and then, with regard to each of those target audiences, what are your specific objectives in terms of the outcomes that you're trying to achieve? And then that should lead you to a system of relevant benchmarks."

But because there isn't much of a historical record regarding e-commerce performance, that's no simple task.

"All the concepts and principles of e-commerce are still

not set," explains Mark Czarnecki, president of The Benchmarking Network Inc., a Houston-based organization that runs and monitors benchmarks between companies.

Normally, there's a set of "anchors" that companies can rely on when they do benchmarking — a defined measure of performance, such as transactions per second or monthly sales, Czarnecki says. "Defining it means there's some kind of stable business process. [With e-commerce], there's not a stable business process," he adds.

The top priority for electronic businesses is turning a profit, says Jim Sample, a consultant at Reston, Va.-based benchmarking service provider Compass America Inc. "The drive toward profitability then trickles back to having to put in some traditional measurement system," he says.

Johnson agrees. "The most

urgent priorities with most of the dot-com businesses [had been] to just get out there and launch," he says. "But it's quite clear that there's much more attention now on performance, and so I think benchmarking is going to become a fairly useful and important tool in helping companies that are going to survive this [dot-com] shake-out [to] really focus on the things that make a difference to their business."

That includes going beyond measuring just Web site traffic and revenue to profit-centered benchmarking, Johnson says.

Valuating Visitors

Profitability is certainly crucial, but it's not the only important benchmark for companies to set for their e-commerce operations. Web site activity is another key benchmark that businesses would be wise to monitor.

"One of the big challenges

that companies face today is trying to determine how much time a customer or a viewer is spending at the Web site, associated with how much revenue they're generating," explains Sample.

Atlanta-based United Parcel Service of America Inc. is one brick-and-mortar firm that's been particularly successful at developing its electronic business. It's been benchmarking its online tracking service every December since the site was launched in 1994.

In December 1995, UPS received 100,000 online tracking requests. By last December, that figure had mushroomed to 3.3 million online tracking requests per day, according to a UPS spokesman.

Having a benchmark in place to measure those requests has helped keep UPS at the forefront of its e-commerce race with rivals such as Federal Express Corp. and

DHL Worldwide Express.

"Online tracking requests are certainly a very important benchmark that we look at, because it's probably the most widely used information that our customers access," says Steve Holmes, a spokesman for UPS.

John Sommerfield, director of corporate communications at San Francisco-based Charles Schwab & Co., says his firm also sees Web traffic as an important benchmark for its e-commerce group.

"There's benchmarking of the response rate [to] a Web page," he explains. "For instance, several years ago, we went through a Web page redesign because people were less interested in visual richness of content vs. availability and the speed at which a screen pops up. So we responded to that. And the number of page views has doubled in six months, but the number of hits has gone down by half, because it takes fewer hits on the server to bring up a piece of graphic."

Examining the Core

But before a company can even begin to devise its benchmarks, it must first examine its core business processes, says Czarnecki. Those include developing and selling products and services to Web customers and running an organization's online operations as efficiently as possible.

Once those core processes have been determined, companies need to figure out how much those processes are costing them. Then, based on that information, businesses can compare their cost structures to those of other companies and evaluate their own performance over time. ▀

Wieder is a Boston-based freelance writer. Contact her at twieder@bigfoot.com.

DEFINITION

Benchmarking is a technique used by businesses to measure the performance of various functions, such as operating a division's desktops, and the cost of supporting those functions.

E-commerce benchmarking is used to help companies compare the costs and performance of their online operations with those of other companies.

Measuring E-Commerce Success

Speed of Web site

How long does it take Web pages to load?

Efficiency of Web site

How many clicks does it take a customer to reach desired information?

Hits per Web page

How many customers are visiting each Web page?

Revenue generated per Web site visitor

How much money is being spent per customer, per visit?

Security of Web site

How secure is the Web site?

JOE AUER/DRIVING THE DEAL

Shrink the scope, save some dough

WANT TO SAVE your company a half-million dollars? Here's how one company's IT negotiating team did it. A large customer with an international brand name wanted a global license for some proprietary middleware. This unique software was to reside between a database and a suite of applications. Predictably, the vendor was delighted to discuss a global license, with big dollar signs dancing in its head.

During discussions, the vendor assumed that the customer's entire organization was going to use the software and the company was, therefore, entitled to a huge license fee. It soon became obvious to the customer's negotiators that the challenge was how to approach the vendor, structure the deal so the vendor didn't feel its software would be used illegally and at the same time pay less than a full "global" amount.

The customer's negotiation strategy focused on how the software would be used rather than on who could theoretically use it. The customer assured the vendor that its product wouldn't help serve the

entire computing infrastructure; it would serve only a limited suite of applications and have only about 25% of the global users accessing them. Using this line of reasoning, the customer convinced the vendor that while the software would be used globally, its use would be limited.

Once the scope of use was narrowed, the size of the license fee was negotiated down. The vendor then became concerned about "usage creep" — that other applications not included in the initial license would be allowed to use its product. The customer addressed that concern by agreeing to predetermined

license fee increases if other applications were added, and the vendor was reminded that its form contract gave it the right to audit the customer's software use. That's a standard contract provision. In the end, these "scope" discussions took about \$500,000 off the customer's license fee. So if you think about how much revenue it takes for a company to make \$500,000 in profit, it was a worthwhile exercise.

The customer also got a perpetual, irrevocable, nonexclusive, worldwide right to use the software, though limited to the applications suite. The vendor got reasonable money for the actual use and gained

contractual protections that its software usage wouldn't be abused. A good deal for both.

Remember that a supplier's traditional position for global software licensing is that everyone will use the software throughout the customer's organization, which maximizes the supplier's revenue. Apparently, nailing the definition of *global* can be worthwhile.

So it isn't always about hammering a vendor for a better price for the same deliverables. Paying for just what you need is also acceptable behavior in doing a better deal.

Surviving A Shakeout

E-commerce is hot but also risky. In just a few years, a considerable number of e-commerce providers began sprouting up, offering electronic products and services ranging from Web site development through Web hosting to application service providers and even the outsourcing of entire networks. These businesses scrambled to provide Web-based capabilities to con-

sumers and other businesses. But a shakeout in their ranks has begun.

Many of these companies aren't surviving the competition. Products and services are quickly superseded by newer ones; experienced staff are hired away; small providers

are squeezed out by more powerful companies; poor business plans are flopping; and consolidations, mergers and acquisitions swallow up others, as reported almost daily on CNBC and in *The Wall Street Journal*. As a customer, there's a risk that the provider you depend on won't be around to maintain and enhance its product or service.

Can you hedge against these

risks? Yes, but not without a concerted effort, which may not be popular with your "do-the-deal-as-fast-as-possible" team members. The supplier contract flexibilities I advocate, including a meaningful way to get back on your own and away from all the vendor dependencies, are critical. You may be betting your assets on your exit clauses! ▀



JOE AUER is president of International Computer Negotiations Inc. (www.dobetterdeals.com), a Winter Park, Fla., consultancy that educates users on high-tech procurement. ICN sponsors CAUCUS: The Association of High-Tech Acquisition Professionals. Contact him at jauer@dobetterdeals.com.

BRIEFS

E-Learning for Banks

The American Bankers Association (ABA) in Washington recently announced plans to offer Internet-based training courses through its subsidiary, the American Institute of Banking, by the end of the summer. About 100 courses, planned for the initial rollout, are aimed at banks' front-line customer service employees. The first module, according to ABA spokesman Adrian Paul, will focus on compliance with banking laws. The new electronic-learning programs won't be limited to ABA members, Paul said, though members will receive a discount.

ERP Spending to Drop

According to a recent survey by Stamford, Conn.-based Gartner

Group Inc., large companies plan to devote, on average, 3.61% of their revenue on information technology next year, plus 1.67% on capital spending. Companies expect to spend 17% of their IT budgets on enterprise resource planning implementation and support, compared with more than 22% last year. Gartner surveyed executives from more than 500 firms with an average of \$1.6 billion in revenue and 6,200 employees.

Dot-Coms Don't Count, Say Employers

Previous work experience at a dot-com doesn't help a candidate during the hiring process, according to online recruiter BrilliantPeople.com, a subsidiary of Management Recruiters International Inc. in Cleveland. Despite the public's enthusiasm for Internet jobs, 64% of the 3,400 executives surveyed said they

don't perceive that experience as an asset.

Yahoo Launches E-Payments Program

Yahoo Inc. in Santa Clara, Calif., last week jumped into the person-to-person online payments market with the launch of its PayDirect service, in cooperation with CIBC National Bank, a subsidiary of Canadian Imperial Bank of Commerce in Toronto. The service, similar to PayPal (offered by Palo Alto, Calif.-based X.com Corp.), lets users send, receive and request payments via e-mail by linking their Yahoo PayDirect accounts to their credit or debit cards or bank accounts.

Search Is on for Execs

The members of the New York-based Association of Executive

Search Consultants reported a 20% increase in searches from the first to second quarters. The growth of the Internet economy has driven much of this increase, and most searches are conducted for e-commerce executives, the association reported. The number of searches for online media and e-commerce executives has increased by 721% from last year. Conversely, biotechnology searches have declined during the past few years.

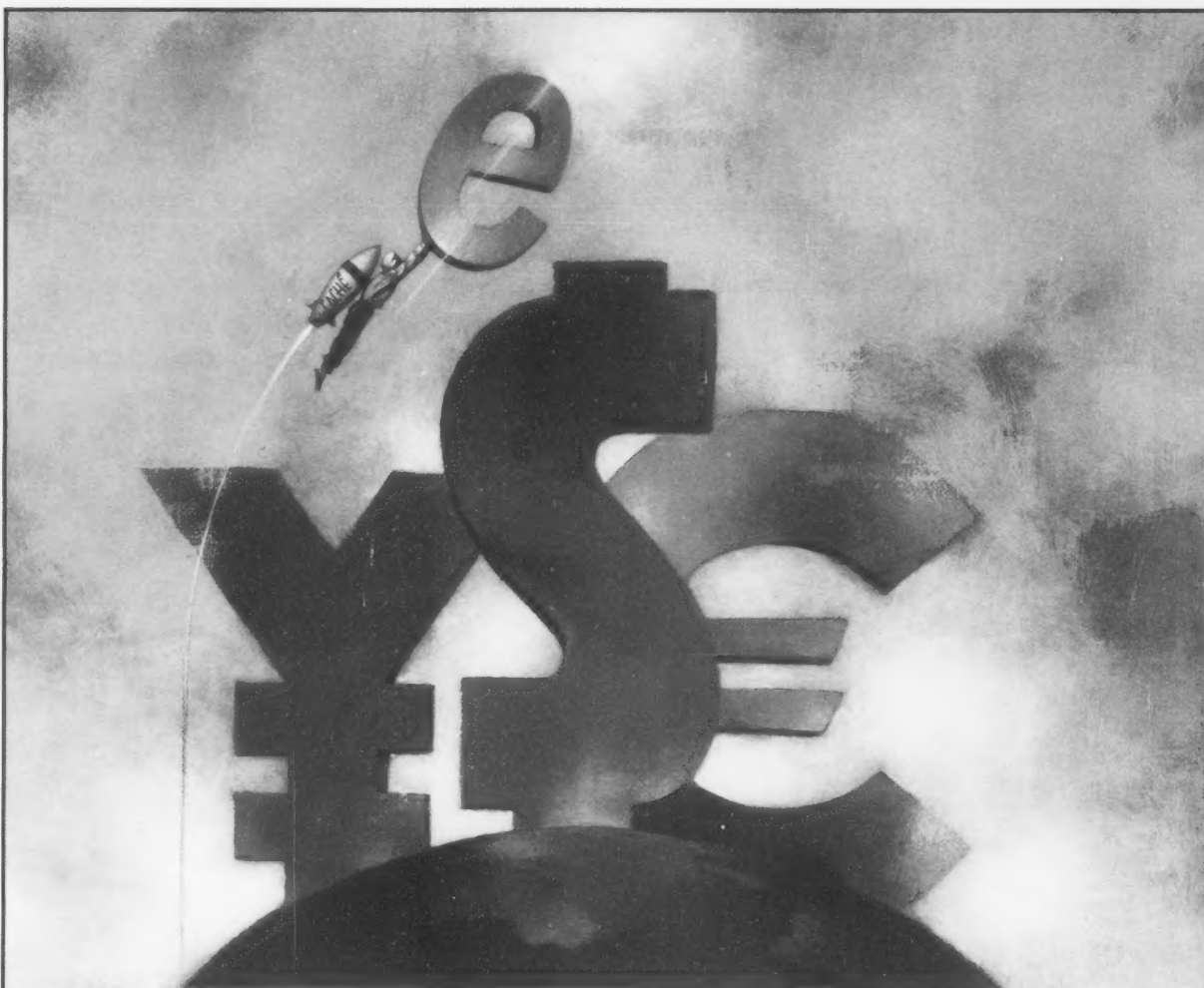
Riverdeep, Edmark Form School Ties

Ireland-based Riverdeep PLC has announced that it will acquire the assets of Redmond, Wash.-based Edmark Corp., a wholly owned subsidiary of IBM, for 4.6 million American Depositary Shares, valued at \$85 million. IBM will hold about 14% of the corporation's stock. Riverdeep develops educational

software for kindergarten through 12th-grade classrooms, and Edmark specializes in software for kindergarten through eighth-grade students with special needs. About 46,000 schools use Edmark's software, says the company.

AOL Makes Japanese Wireless Alliance

Dulles, Va.-based America Online Inc. and Tokyo-based wireless giant NTT Mobile Communications Network Inc. (DoCoMo) will jointly develop wireless Internet services in Japan, according to sources. Each company would invest \$100 million in AOL Japan, and AOL Japan would become the DoCoMo exclusive fixed-line Internet service provider. AOL Japan will also receive preferential treatment on its i-mode wireless service, allowing subscribers to access e-mail and Web sites via smart phones.



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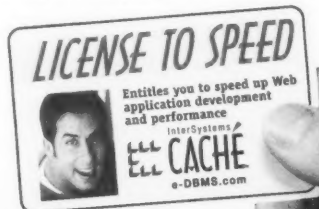
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TECHNOLOGY

EASIER NEURAL NETS

Hoping to make it easier to build neural network capabilities into existing applications, Computer Associates has combined its neural network offering with its Jasmine ii application development and business platform. **62**

HACKING THE HACK

After Microsoft issued a fix for a security flaw in its Access database, Anchorsign CIO Timothy Mullen found a flaw in the work-around. He contacted Microsoft and then discovered a way to turn the vulnerability against itself. **65**

HANDS ON

At long last, you can run your laptop on batteries all day. Reviews editor Russell Kay tries out Electrofuel's PowerPad 160 battery and finds it can give him 12 to 16 hours of cord-free computing. **66**

NEW SECURITY MANAGER

Ex-security consultant "Jude Thaddeus" joins the real world as a security manager for a multinational firm. In his first week, he learns how hard it is to implement all that simple advice he used to give. **67**

QUICKSTUDY

A memory leak is the deterioration of system performance that occurs

over time when a poorly programmed or designed application fragments a computer's RAM. Garbage collection is the automated process whereby memory space no longer needed by current applications is consolidated and freed up for reuse. Learn more about these phenomena. **68**

FUTURE WATCH

Scientists toeing the line between the organic and inorganic realms have found that some viruses can link the two by making substances called biocomposites, which eventually could be used as electronic components. **69**

STORAGE DILEMMAS

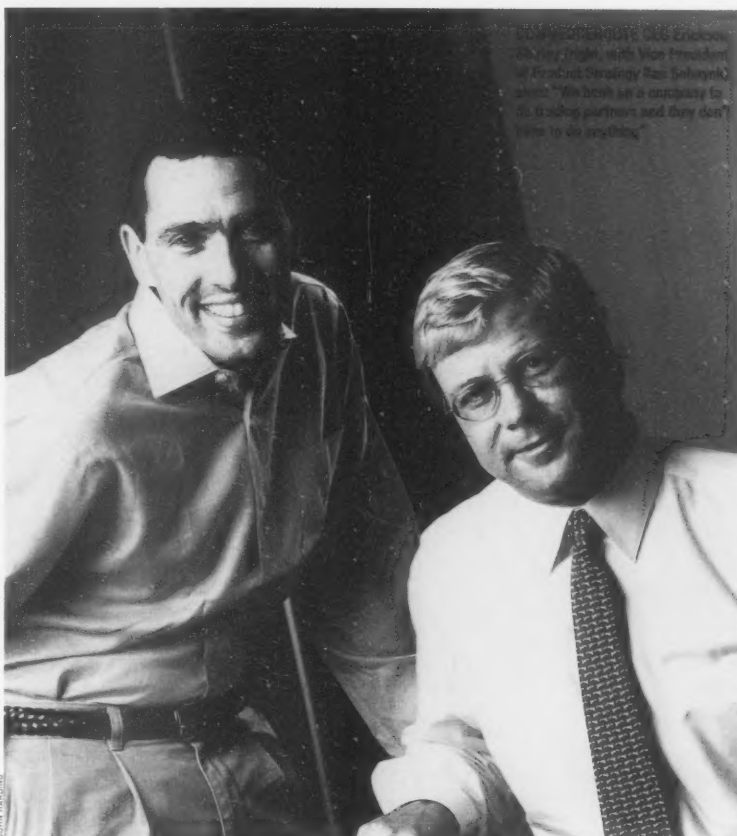
Everything from enterprise resource planning systems to Web transactions seems to generate terabytes of data. Network-attached storage is a relatively inexpensive and easy way to manage the data; a storage-area network is more powerful but more expensive and harder to build. Here's how large companies are deciding which to use. **70**

THWARTING CARNIVORE

Skeptics argue that the FBI's Carnivore network monitoring tool can't possibly scan only the network traffic of suspects. As a response, several vendors are offering ways to outfox Carnivore. **73**

MORE

Trendsetters **76**



PAINLESS B2B TRANSACTIONS

START-UP COMMERCEROUTE wants to be the traffic cop for business-to-business transactions over the Internet. Its GlobalConnect services route billing and other data between value-chain partners on a pay-as-you-go basis, implementing data-translation and workflow rules along the way. It promises simplicity and cost savings for companies with many partners and high transaction volumes.

74

CA Bundles Neural Net, App Development Tools

Builds applications that find data patterns and determine their importance

BY SAMI LAIS

HOPING TO make it easier to build neural network capabilities into applications, Islandia, N.Y.-based Computer Associates International Inc. has combined its neural network offering with its Jasmine ii application development and business platform.

Released late last month, Neugents ii is a combination of CA's Neugents neural network technology and Jasmine ii, the software vendor's electronic-business platform and application development tool.

Neugents ii is already being tested by customers such as New Scotland Yard as a means of improving their data analysis capabilities.

Discussions with systems ad-

ministrators and user groups have revealed that information technology managers are reluctant "to trust [Neugents] for infrastructure management," said Patrick Dryden, an analyst at Illuminata Group Inc. in Nashua, N.H.

"But for data analysis where it may show some helpful patterns you can use in your business, it makes sense," Dryden said, adding that Neugents ii is "a response to customer demand for tactical problem solving."

Carl Hartman, vice president for e-business management at CA, said Neugents ii includes "those components of Jasmine ii needed to build Neugents ii applications."

Neugents detects patterns in data and over time "learns" which patterns are significant, Hartman said. The technology surpasses data mining in pattern detection, he said, because "data mining is fine when you know the question; Neugents find answers to questions you didn't know to ask."

No Fields Required

Neural network technology

doesn't require defined fields in data to detect patterns, Dryden said, but can "look for string searches in text, like police reports. 'It's a brute-force time-saver that throws the processing power into looking at zillions of numbers and tells you, 'Here are some interesting trends.' But your business-process people have to look at those trends and decide what's



PHIL STONEMAN
is using Neugents
to spot criminals

important," Dryden said.

With Neugents ii, results of the pattern detection can be presented within a user's application as one screen or a series of screens, Hartman noted.

New Scotland Yard in London is among the more than 500 sites doing Neugents proof of concepts, pilots or production implementations, Hartman said.

With crime on the rise and the number of police officers falling, London's Metropolitan Police Service was "looking for a way to leverage crime data it has," said Phil Stoneman, an IT manager at New Scotland Yard.

Still in the proof-of-concept stage, Neugents will look at data from five databases, including crime reports, forensic evidence and mug shots, Stoneman said. The hope is that Neugents "will detect patterns, especially in burglaries, that will help us identify serial burglars," he said.

Finding Buyers

CityStreet.com in East Brunswick, N.J., has finished a proof-of-concept phase and begun a Neugents pilot in its retirement planning division, said Ira Schwartz, the company's executive vice president and chief operating officer.

The online financial consultancy had sought to analyze customer data and determine whether customers had bought a particular financial product. Lacking experience with Neugents, CityStreet sent the data to CA, which used Neugents to create profiles of customers who had or hadn't bought the product.

Of 1,000 nonbuying customers, about 200 fit the profile of a buyer, Schwartz said. That list of potential customers will likely provide a high rate of sales, he said.

Coal-based utilities are already using a Neugents-based application called NeuSight to help comply with the Clean

Air Act, said Ted Venners, chairman of utility services vendor KFx Inc. in Denver.

NeuSight, from Pegasus Technologies, a division of KFx, monitors as many as 600 data points, such as temperature and weather, to determine the optimal conditions for the clean burning of coal, Venners said. "That's too complex for human operators to calculate," he noted.

Plants using NeuSight cut emissions of greenhouse gases



TED VENNERS
says NeuSight
may clear the air

such as nitrogen oxide and carbon dioxide by an average of 30%, Venners explained. "They're investing hundreds of thousands of dollars to avoid spending tens of millions of dollars," he said.

The software often brings plants into Clean Air Act compliance, he said, without the need to spend \$40 million or more on a hardware scrubber.

Pre-existing Agreements

AI Ware Inc., which produced the technology on which Neugents are based, was purchased by CA several years ago. Pegasus held a licensing agreement from AI Ware to use the technology in energy industry software, an agreement CA honored after its purchase, Venners and Hartman said.

Hartman declined to comment on whether other licensing agreements exist or are being contemplated.

"That's a caution" for customers to consider, according to Dryden.

"Anyone buying the software should maybe pin CA down to find out if there are any pre-existing licensing agreements" that might keep customers from using Neugents ii to build their own, competitive applications, he said.

Neugents ii pricing begins at about \$225,000, according to a CA spokesman.

The starting price for Jasmine ii is "a few thousand for a small, single-process server," the spokesman said. But for most enterprise applications that are running on many servers, the cost of Jasmine ii would likely scale up to more than that of a similar implementation using Neugents ii, he said. ■

ASPs Begin to Offer Application Integration

Small and large firms could benefit

BY MARK HALL

Application service providers (ASP) claim to offer virtually everything an information technology manager needs, except software integration. And even that's changing.

Some ASPs are now courting developers to write applications integrated under strict guidelines set by the ASPs. While these integrated applications are aimed at the small and medium business market, they are often useful for larger companies that need applications for a temporary or mobile workgroup.

Last week, SoftwareMarkets Inc. in Fremont, Calif., announced its new online application catalog service. If developers write easily integratable

applications using SoftwareMarkets' proprietary Java extensions, the company will certify the application's ability to integrate, market it and provide users other services such as security and tech support.

Rick George, CEO of Chamleon Inc. in Palo Alto, Calif., which develops project management software, said he has been impressed with the beta version of the new ASP's Java platform, particularly the underlying object database.

Manpower, Money Saved

Using traditional databases, he says, entire staffs might be needed to design the schema that defines elements such as fields for names or customer billing information.

With SoftwareMarkets' tools, according to George, "you give it any Java object and the object can determine where the data within it should be

stored in the database."

FreeMe Inc. in Austin, Texas, which introduced its U-Platform last month, has added its own suite of integrated software, such as e-mail, groupware and calendaring, as a basic package for customers and to prove its integration capabilities. While SoftwareMarkets uses Java with its own extensions, FreeMe uses proprietary technology that outputs XML to browsers.

Chris Engle, director of research at Angelou Economic Advisors Inc., a site-selection consultancy in Austin, Texas, is using the beta version of FreeMe. He said his company has struggled to synchronize e-mail accounts for traveling users, a problem FreeMe's integrated, Web-based applications seem to solve. Engle added he will save money by not having to purchase security software. ■

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~~wants~~ a bigger salary
than you.

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job market, "paying your dues" can
mean working for less than six figures.
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resource for all the latest IT news, products, job
listings and more. To start your search,
visit www.ITcareers.com.

E.piphany Launches Next-Generation CRM Software

BY LINDA ROSENCRANCE

E.piphany Inc. in San Mateo, Calif., late last month introduced E.5, the next-generation of its customer relationship

management (CRM) software.

The system represents the most comprehensive combination of operational and analytical CRM systems on the

market, users and analysts said.

Operational CRM applications gather customer information across various channels such as phone, the Web and call centers. Analytical CRM systems analyze the data collected to help companies improve customer satisfaction with an eye toward increasing profits.

E.piphany customers, such as Nissan North America Inc. in Gardena, Calif., and Internet retailer Buy.com Inc. in Aliso Viejo, Calif., said they are upgrading to the E.5 system because it should help them better understand their customers' needs.

For Nissan, E.5 will allow content personalization on its Web site for consumers, based on a variety of conditions, including customer location, past online or off-line interactions and click-through patterns, said Ted Ross, Nissan's relationship marketing manager.

Travis Fagan, vice president of customer service, said Buy.com plans to upgrade to E.5 because it wants to tie its marketing strategies with its customer support efforts, something Buy.com was unable to do before.

As a result, Buy.com "will be able to obtain a single view of our interactions

Just a reminder that there are a growing number of reasons to host your Web site on a Microsoft® Windows® 2000 server.

Since its recent release, Windows 2000 has already become more popular for U.S. e-commerce Web sites than Solaris 8, IBM AIX, MacOS, IBM AS/400 OS, Digital UNIX, and HP-UX.

— data from Netcraft, June 2000
U.S. E-commerce Survey

Microsoft

Where do you want to go today?
microsoft.com/windows2000

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Widespread Use

E.piphany products run on open systems including Microsoft's SQL Server for Windows NT and Windows 2000, and Oracle for Unix.

PLATFORMS

Windows NT
Windows 2000
Solaris
HP-UX

DATABASES

Oracle
SQL Server
Open Database Connectivity/Java
Database Connectivity interfaces

from all perspectives — marketing, sales and service — so we can provide everyone with the same knowledge about customers" and personalize offerings to them, Fagan said.

Despite the strengths of the E.5 system, it does have at least one shortcoming — a lack of support for field sales forces, according to Bob Chatham, an analyst at Forrester Research Inc. in Cambridge, Mass. ■

BRIEFS

New Intel Chip Breaks Gigahertz Barrier

Intel Corp. has announced a Pentium III processor that breaks the gigahertz clock speed, at 1.13 GHz. Advanced Micro Devices Inc. (AMD) has a 1.1-GHz chip, which begins shipping late this month.

The faster chips are considered important to software designers, engineers doing computer-aided design and game players, but several analysts said they aren't required for most typical office functions. IBM also announced last week that it is producing an Aptiva S desktop PC running the 1.13-GHz Pentium III. It starts at \$2,999.

Compaq Releases SAN, NAS Appliance Servers

Compaq Computer Corp., as part of its enterprise network storage architecture strategy, last week introduced the StorageWorks RAID Array 4100 SAN and the TaskSmart N-Series NAS appliance server. The network-attached storage (NAS) TaskSmart is available now and will work on Windows 2000. Pricing information wasn't available. The storage-area network (SAN) 4100 is aimed at workgroups and small and medium-size businesses. It supports Windows, Unix and Linux. Pricing is based on configuration.

Study: Net Management Tool Use Expected to Soar

Infonetics Research Inc. released a study finding that use of network management tools will rise and that hardware and software expenditures in that area will grow 50%, from \$1.6 billion to \$2.4 billion by 2004. The study, "User Plans for Network Management in the US 2000," highlights other topics of interest to follow over the next few years, including security needs that will drive user purchases of software and hardware. The study said there will also be an increase in application management tools in the next two years.

Veritas Introduces Mirroring Feature for Databases

Veritas Software Corp. in Mountain View, Calif., introduced FastResync and a new version of its Volume Manager. FastResync creates and manipulates mirrored copies of databases and other critical application data online. FastResync will be available this month starting at \$2,995. Volume Manager 1.3 features an "improved hot-relocation" feature, which relocates data from the trouble spot on the disk to a location where data is accessible to users. After the faulty disk is replaced, users can return the data configuration to its original state. Volume Manager 1.3 supports Solaris and HP-UX environments. It will also be available this month starting at \$2,995. www.veritas.com

CUT AND SAVE TO EXPOSE THE "CREATIVITY" USED BY HARDWARE COMPANIES TRYING TO SELL YOU SOFTWARE.

DEBORAH RADCLIFF/HACK OF THE MONTH

Fighting hacks

TIMOTHY MULLEN is a hacker in the truest sense because he's always testing the limits of technology. Take July, when he wasn't content to take at face value Microsoft's work-around for the Windows Access

vulnerability. (That's the really scary vulnerability in which crackers can drop evil scripts into HTML tags [*Computerworld Online*, July 18] and exploit the Access database program to launch any type of program they want on Windows machines.)

Mullen, CIO at Anchorsign Inc., a Charleston, S.C., producer of electronic signs, analyzed Microsoft's work-around, which was included in its update and patch at www.microsoft.com/technet/security/bulletin/MS00-049.asp.

The work-around gave administrators, through Microsoft Access Work Group Manager, the option of prompting users for their names and passwords before launching Access programs. The prompt tells the user that someone is trying to launch Access and allows the user to prevent that from happening.

Mullen's curiosity led to an amazing discovery. The work-around didn't protect machines running Access 2000.

That's because the work-around works only with the file type that executes Visual Basic for Access code in older versions of Access — the Microsoft Database file, said Scott Culp, Microsoft's security program director.

With Access 2000, Microsoft introduced new file types called Access Data Project and Access Project Extension that allow users to directly link into a SQL Server database so they can write code and directly program stored procedures, tables or other functions, Mullen says.

By exploiting these new file types, attackers can still launch malicious scripts without Access telling the user until after it has launched the malicious file, Mullen continues.

When Mullen explained this to the SANS Institute (www.sans.org), a cooperative/educational organization for systems administrators and

security professionals, research director Alan Paller described the problem as a serious threat.

"The problem is, you've got two different file types in Access that carry out the script — one of which requires a password, and one that doesn't," Paller says. "The one that doesn't require the password is much smaller, so the damage would happen faster."

On July 20, the SANS Institute contacted Microsoft.

"We thought it was prudent to pull the patch back and provide fixes for all the variants of this vulnerability, including those that aren't publicly known like [the Access 2000 vulnerability]," Culp says. "We're hoping to get a patch out soon. But it takes time to make it run correctly with the thousands of other program combinations it might end up in."

Although no victims have yet come forward, SANS Institute members worried about what would happen if the vulnerability were discovered before the patch was released.

So Mullen found his own solution in the vulnerability itself, which he used to push out his own temporary fix to his 100 users spread among three offices nationwide. His fix was a small program that accessed specific keys in the Windows registry and disabled the two new file types.

It was bound to happen sometime. Hack the hack. Exploit the exploit. But Microsoft isn't too keen on this for several reasons. Users will become complacent about viruses and vulnerabilities if people start using them for good, he claims.

"Besides," Culp says, "you could easily roll out patches much faster through Microsoft System Management Software and other tools made to do that."

Mullen had already thought these things out. He masked the embedded HTML code to look like ordi-

nary text so employees wouldn't notice anything unusual. He pushed the mail out late at night. And he used his SQL database to track the Internet provider addresses before remotely rebooting each machine.

Mullen says he rests easy knowing

his network is "bulletproofed" against the vulnerability, while the rest of the world waits for Microsoft to release its patch. Besides, he adds, "It's kinda fun fighting fire with fire."

Sounds like a hacker to me. ■



DEBORAH RADCLIFF is a *Computerworld* feature writer. Contact her at deborah_radcliff@computerworld.com.

Just a reminder
the next time you're
thinking about which OS to
use in the new economy.

**Of the secure
e-commerce
sites conducting
business, 52%
run on Windows;
while only 11%
run on Sun.**

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And Power To Spare

This is battery life like you've always dreamed of. It just keeps going and going . . .
By Russell Kay

ONE OF THE biggest advantages — and, at the same time, the single biggest disadvantage — of using a notebook computer is the fact that it runs on batteries. You don't have to plug it into a wall socket — until your battery runs down, that is. Today, a typical notebook can run for two to three hours on batteries, and that's been good enough to quiet some users' complaints. (I well recall the laptop I used to use — a 486 with a gigantic 500MB hard drive — whose battery was good for about 45 minutes.)

Add a second battery, and even Patrick Thibodeau, Com-

puterworld's Washington bureau reporter, can get through a whole day's worth of U.S. District Court Judge Thomas Penfield Jackson.

Still, the dream persists: Why can't a laptop run all day on battery power? Several years ago, I saw an add-on battery that was advertised as giving a laptop seven or eight extra hours of use. The major problem with that particular unit was that it was, in fact, larger than the computer itself. Taking that battery with you on an overseas plane trip, for example, just wouldn't be a reasonable proposition — unless, perhaps, you bought it its own seat!

More recently, I've seen and used a new product that comes

pretty close to filling the bill. Electrofuel Inc. in Toronto claims that its PowerPad 160 delivers 12 to 16 hours of computing to your laptop. Based on my experience so far, it's not an exaggeration.

Putting It to the Test

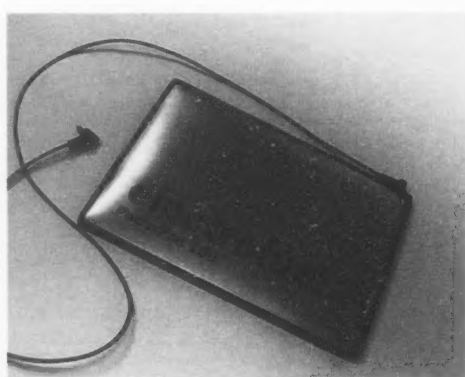
I set up an IBM ThinkPad 600E running Windows 2000 Professional and turned off every bit of power management I could in both the operating system and the BIOS. I set up a continuous process that copied 800MB of data from one directory on the hard drive to another, deleted it and then started all over again.

Beginning with a fully charged ThinkPad battery and a fully charged PowerPad 160, I started the process at 9 a.m.

When I got home from work, it was still chugging away. (Interestingly, since the PowerPad plugs into the ThinkPad's normal power plug, the ThinkPad still thought it was running on AC.) Finally, at approximately 10:30 p.m., after running for thirteen and a half hours, the PowerPad was depleted and the ThinkPad realized it was now running on its own internal battery. Three hours later, that, too, expired.

So, I got sixteen and a half hours between the two batteries. I was duly impressed.

The PowerPad doesn't look like a battery. It looks, in fact, like an overgrown mouse pad. It's about 9 by 12 in., just over 0.25-in. thick and weighs about a pound and a half. In use, you just put it underneath the laptop — or you can sit on it, if



that's your preference.

You recharge the PowerPad with the laptop's own power supply brick, using a piggyback plug that's supplied with the pad. You can use anywhere from 16 to 19 volts, though a lower voltage will result in a shorter battery life. There's a five-light "fuel gauge" in the lower right-hand corner. It fully recharged overnight.

A Price to Pay

The PowerPad is pretty state-of-the-art for a battery today. It uses a lithium-polymer technology that offers a very high energy density.

Lithium polymer is gaining in popularity for many devices, mainly because it can be molded into odd shapes and cleverly tucked away inside a casing.

But in the PowerPad, that's not a factor. Your basic rectangle suffices, and the PowerPad's designers have actually made a very smart decision regarding

POWERPAD 160
ELECTROFUEL INC.
Toronto
(416) 535-1114
www.electrofuel.com

its size. It's so thin, you don't really notice it's there, and since it's about the same size as the laptop, it doesn't stick out anywhere either.

Is this too good to be true, you may be wondering? Well, at \$499 a pop, it's not cheap. And it's not available for every laptop. (This is mainly a cable and connector compatibility problem. When I requested a review unit for my Dell Computer Corp. Latitude CPi, Electrofuel couldn't supply one without delay; it did have the ThinkPad version on hand.)

One final note: Electrofuel's next model, the PowerPad 210, is already in the development pipeline, and it will reportedly offer 21 hours of computing. ▀



THE POWERPAD 160'S FLAT SHAPE makes it easy to tuck into any bag, right alongside your laptop

New Manager Sees How Security Gets Done — Not!

Nothing is easy, he finds — not even simple jobs such as updating antivirus software

Editor's note: The former author of the weekly *Security Manager's Journal*, "Pat Rabbinski," has been called away by other responsibilities (no, he hasn't been fired — honest!) and will no longer be writing this column. We have recruited another newly minted security manager, "Jude Thaddeus." He has an impressive job title — but he sure would like some control over budgets and project plans.

H EAD of information systems security. A good job title, and one that rolls off the tongue rather well. Very impressive. Still, it would be better if I were head of something more than my own body, or had budgetary control or some project life cycle input.

Newly promoted and relatively new to management, I think my job is going to be rather challenging. With a master's degree in security, the arrogance of youth and a few years of good consultancy and auditing experience behind me, I'm quite confident in my specialist knowledge. But now I'm responsible for information security across the European operations of a multinational firm, and the enormity of the task ahead is occasionally a little humbling.

I can't just turn in nicely written reports outlining vulnerabilities, business risks and recommendations any more. I've got to actually do something now.

My first job is to look at the antivirus mechanisms. The antivirus mechanisms here are in the same state as those at many companies I've seen while consulting: We have one of the best-known industry products installed on pretty much every workstation, laptop and server. So why do we still get hit by viruses?

Maybe it has something to do with the fact that users sometimes bypass the intrusive update procedure — if it works in the first place — so that many of the workstations are out of date. Maybe because no one ever looks at the log files, so no one knows about infections until they reach epidemic proportions. Maybe because we allow Big Five

consultants with their out-of-date laptop antivirus scanners onto our LAN. Maybe it's one of a whole lot of reasons.

This is where the difference between a consultant and a manager becomes quite clear. I identify three simple actions that would make an enormous difference to our antivirus protection, write them up in a beautiful report with a punchy executive summary and pass it to management.

They say, OK, do it.

Those actions may look simple on paper — in fact, trust me, they look extremely simple on paper — but putting them into practice brings a whole range of issues out of the woodwork.

Not So Easy

One particular upgrade conflicts with our desktop management process. Another seems simple, but no one can get it to work at the moment. And our platinum support line (not silver, not gold, but platinum. Wow.) is closed because it's a bank holiday in Holland. A third could be politically sensitive at our overseas head office. Our antivirus vendors don't seem to understand our questions, let alone provide answers.

Better still, as soon as I start investigating the whole antivirus situation, I find a whole list of technical problems with the software, Symantec Corp.'s Norton AntiVirus 5, and learn that our global license expires soon.

Our security engineering team at our overseas headquarters is aware of the problems and wants to look at other packages. Our senior management has mandated that two people evaluate replacements that might handle an emergency like the "Love Bug" a little better. I add my voice to those calls for change... and the manager responsible for desktop and server antivirus protection signs a new two-year contract with Symantec without even stopping to think.

A quick scan shows that of the people logged in to any of our European networks today, slightly more than half are at least two weeks out of date with their

antivirus definitions. A quick visit to some of the users in the IT department gives some interesting reasons: One system administrator has set up his machine to refuse all externally initiated connections so that he can keep control of his own PC. A developer's desktop is so corrupt that most of the icons and menus don't work, but he didn't want to bother the help desk. A Unix engineer complains because his Windows machine is so unstable, but he almost never reboots and doesn't see any connection between the two.

I'm facing a mountain of work in order to deal with — let's face it — one of the best-understood problems in IT security. I'm not looking forward to tackling something like public-key infrastructure.

Top 10 List

The SANS Institute sticks its oar in with the list of the top 10 security vulnerabilities on its Web site. This follows on the heels of a 9MB text file from our audit team purporting to list the technical vulnerabilities on a few of our test servers. Who let them have an automated scanning tool? Stupidly, I send the audit report to the printer before I check its size, creating a major backup on our network printer queue.

We agree with internal audit that we will keep their report on file and address its contents as soon as we have the resources. Meanwhile, impressed by the catalog of the great and the good who have signed up to the top 10 list, I check whether any vulnerabilities apply to us.

Yes, some of them do.

The Short and Long of It

Again, the list looks relatively easy to address. All the relevant technical information is provided, there are clear descriptions of the fixes and — best of all — there are only 10 of them.

We begin tackling them, and immediately problems surface. Yes, I agree that these are only short-term fixes; no, they aren't a substitute for a well-controlled management procedure; no, I can't tell you whether you're running Microsoft Internet Information Server's Remote Data Services (threat No. 4 in the SANS report). They're your servers, so you should know.

I know it will improve our security if we resolve these 10 vulnerabilities. However, given my experience with the antivirus mechanisms, I have this feeling that it's not going to be that simple. ...

THISWEEK'S GLOSSARY

Love Bug: Common name for the VBS.Loveletter Visual Basic for Applications script virus delivered through a Microsoft Outlook e-mail attachment.

Microsoft Internet Information Server 4.0's Remote Data Service: A data-caching mechanism that lets clients access sets of data, manipulate them and send them back to the server. Hackers are able to exploit several flaws in this program to gain administrative privileges on the server (for more information, see the link to the SANS Institute below).

Public-key infrastructure: A cryptography system that requires separate encryption and decryption keys. Simply having the encryption key won't allow you to decrypt a message created with that key. In this system, a user is assigned both a private key and a public key. By sharing the public key, the user can allow others to encrypt and send messages that can only be read by the user's private key.

Antivirus definitions: The short signature files an antivirus scanner software uses to recognize viruses.

LINKS:

www.sans.org: The SANS Institute is a research and education organization for system administrators and security professionals that has more than 96,000 members. Its Web site is a must-read for every security manager.

www.microsoft.com: Microsoft Corp.'s Web site has updates on the Love Bug virus and Outlook. Click on support and search for Love Bug.

www.ibm.com: Lotus Development Corp.'s Web site includes information on Lotus Notes e-mail and groupware.

www.antivirus.com/vinfo: Trend Micro Inc.'s virus encyclopedia includes a highly detailed list of many known viruses, including Love Bug.

www.symantec.com: The Web site of Symantec, which makes the Norton AntiVirus software.

■ This journal is written by a real security manager, "Jude Thaddeus," whose name and employer have been disguised for obvious reasons. It's posted weekly at www.computerworld.com and at www.sans.org to help you and your security manager better solve security problems. Contact him at jude.t@lycos.com or click on Computerworld's Security Watch community forum.



Security Manager's Journal

Memory Leaks and Garbage Collection

DEFINITIONS

A **memory leak** is the gradual deterioration of system performance that occurs over time as the result of the fragmentation of a computer's RAM due to poorly designed or programmed applications that fail to free up memory segments when they are no longer needed. **Garbage collection** is the even stranger term given to the automated process, found in some systems and languages, whereby memory space no longer needed by current applications is consolidated and freed up for reuse.

BY RUSSELL KAY

ONE OF THE more quaintly mysterious notions in the world of computer software, especially Windows, is the memory leak. It's so commonly encountered that *leak* is used as both noun and verb: "That application leaks memory like crazy." It's a major cause of system instability over time and can be a nightmare to deal with. If a program runs continually, the smallest leak will eventually and inevitably lead to a program or system crash because more and more resources get locked up until they are exhausted.

Memory Leak

A memory leak starts when a program requests a chunk of memory from the operating system for itself and its data.

As a program operates, it sometimes needs more memory and makes an additional request. Now we come to one of the rules of good program-

ming: Any memory that is requested and allocated should be explicitly released by the application program when it no longer needs it and, in any case, when it closes. A program that does this is called well-behaved.

Unfortunately, not all programs are well-behaved. And a program's failure to delete objects properly often doesn't show up right away because the program is either a short utility or doesn't create very many instances of objects, so it takes much longer to exhaust resources.

But program objects can have other side effects that don't go away when the program terminates. A programmer should never assume that objects perform only benign operations that are undone when the program ends.

Besides, programs sometimes end unexpectedly, or crash, before they can shut down in an orderly fashion and give back their memory. The result is that pieces of memory

scattered throughout the system's RAM are marked as in use and untouchable except by its owning application—even though that's not really the case. Over time, as a number of ill-behaved applications run, more and more memory leaks into this unusable state, and the amount of memory available for use gets smaller and smaller.

The operating system or system software itself isn't necessarily leakproof. (In late 1998, Apple Computer Inc. posted a fix for an AppleScript memory leak at <http://til.info.apple.com/techinfo.nsf/artnum/n26165>.)

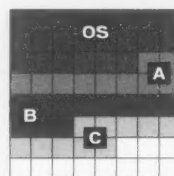
Eventually, the operating system finds that there's not enough memory to do almost anything it needs or wants. Then it produces an error message saying memory is low and requests that some applications be closed to free up space. But because the applications that locked up much of that memory aren't really running, you can't free up the space by closing them down. The usual fix is to reboot.

Garbage Collection

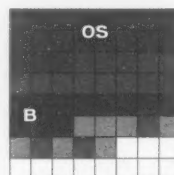
Freeing up the operating system for reuse of the space that has been taken over by memory leaks is called garbage collection. In the past, programs have had to explicitly request storage and then return it to the system when it was no longer needed. The term *garbage collecting* appears to have first been used in the Lisp programming language, developed in the 1960s. Some operating systems provide memory leak detection so that a problem can be detected before an application or the operating system crashes.

Some program development tools, like Java, also provide automatic housekeeping for the developer. The real advantage to this is that the process happens whether or not the programmer accounts for it. ■

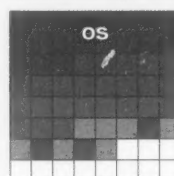
Drip, Drip, Drip



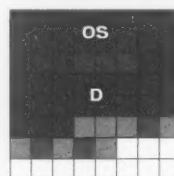
1. This grid represents a computer's memory. The blue squares are memory used by the operating system and the brown cells represent system utilities and programs. Now, we start up three applications: A, B and C (orange, green and yellow, respectively). Each requests and is given a chunk of memory by the OS. So far, everything is clean and neat.



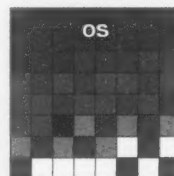
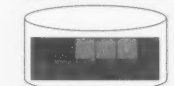
2. Time passes. Program A finishes but doesn't tell the OS that it no longer needs its memory. Those areas are in red to indicate that they're unavailable. This is a classic memory leak. Program C, better designed than Program A, finishes. Though it gives back most of its memory, it still hangs on to a few bits. These leaks break up the overall block, making it harder to reuse the space efficiently.



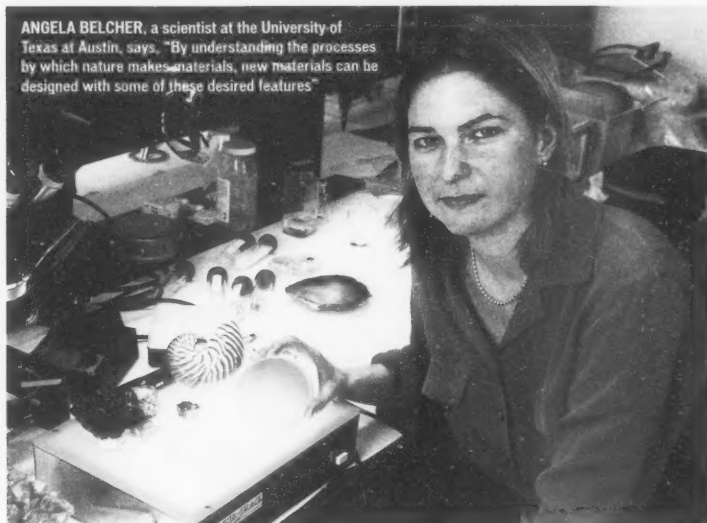
3. Application B ends, and it gives back all of its memory. But Application D starts up and needs a contiguous chunk of memory 20 blocks long. But there aren't any chunks that big to be found. The biggest piece, involving all of the memory that B had used and the first part of C (now turquoise), is only 16 blocks long. The OS can't give D what it's asking for.



4. OS has to round up the unreleased areas of memory (in red). It can look at the area used by the now-closed Program A and see that, even though it's still "on reserve," it hasn't been used in a while. The OS picks up everything in that space and copies its contents to a "swap file" on the hard drive, where it will stay until called for. After that, the OS clears out the memory, marks it available and checks to see if there's room for Program D.



5. Sometimes, however, when enough memory has leaked, the available memory becomes so fragmented (just like a hard drive) and broken up that it's close to unusable. Here, the OS can't really remedy the situation in an effective manner. The only real remedy may be to reboot.



You Want Bugs In These Chips

Viruses bring life to semiconductors. By Barbara Forster

YOU MIGHT not recognize the assembly lines of the future. In fact, you might not even be able to see them without a microscope.

In June, researchers at the University of Texas at Austin (UT) announced that viruses can produce microscopically small and uniform semiconducting building blocks for components that eventually could be used to build computers, pagers and other electronic devices. The process used by UT scientists combines proteins from viruses with inorganic elements often used as semiconductors. This results in a hybrid called electronic biocomposite materials. Natural biocomposite material includes bone and shells.

Angela Belcher, UT's lead scientist for the project, says that once the proteins bind to specific inorganic particles, they are capable of assembling a desired molecular pattern.

The UT scientists went

through 100 million viruses before determining which worked best with particular materials. Only proteins that bound themselves tightly to the inorganic material were cloned. Belcher compares it to rounding up 100 million people who try to unlock the same door until they find the one with the right key.

The key already exists in nature. Take the simple but

rugged abalone shell, a natural biocomposite product of 2% organic and 98% inorganic materials. Constructed of calcium carbonate crystals that are siphoned from seawater and held together with a mortar of proteins and complex sugars, abalone shells are as strong or stronger than advanced synthetic ceramics.

Mammals produce biocomposite materials such as bone

and cartilage. Nonvertebrate sea creatures surround themselves with shells made of biocomposites. Whales' teeth are made of baleen, a product that strongly resembles plastic and was once used for whalebone corsets. Human bones, teeth, fingernails and hair are biocomposites as well.

These materials are now the starting point for modern scientists. The initial goal is to "control crystal growth and placement and assembly of nanoparticles using tools from nature," says Belcher. Nanos is the Greek word for dwarf and refers to the construction of highly miniaturized devices.

According to Belcher, "Nature makes materials that are both strong and tough and that display exceptional nanostructure regularity."

Living systems form organic-inorganic structures by processes that are responsive to local stimuli, are self-correcting and involve disassembly and reassembly. "By understanding the processes by which nature makes materials, new materials can be designed with some of these desired features," says Belcher.

Researchers have already identified proteins at the ends of viruses that differentiate between semiconductor alloys and bind to specific ones. Selective specificity is critical, says Evelyn Hu, a professor of electrical engineering at the University of California at Santa Barbara and also a member of the UT team.

"This sounds like science fiction, and we are years away from doing this, but selective specificity means you could dump all the components into a virtual vat and assemble fairly complex and sophisticated

products," Hu says. "The instructions would be in the building blocks themselves, rather than in a master builder that would order the process."

Scientists could use viruses to "grow" electronic building blocks for transistors, wires, connectors, sensors and chips significantly smaller than anything currently manufactured. The components would be so tiny that scientists would have to use atomic force and electron microscopes to see them.

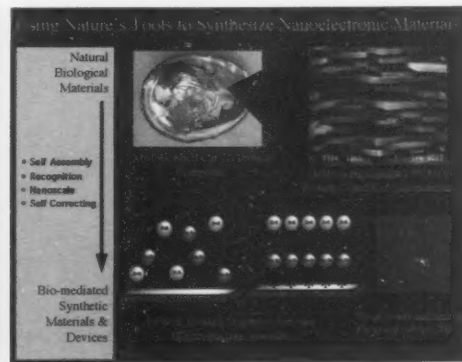
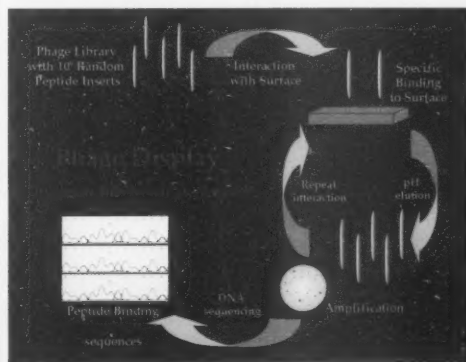
That's great news for the electronics industry, which experts claim is fast approaching the current limits of miniaturization. In electronics, smaller is faster, cheaper and more convenient — so much so that the federal government has declared nanotechnology a national research priority.

Researchers also are working to enlist other proteins as biological assistants. Cockroach cuticle, which contains a springy protein that doesn't swell when it meets organic solvents, is perhaps the future source of rubber gloves.

A hybrid of silkworm protein and fibronectin — a blood protein that promotes cell adhesion — forms an ideal medium for growing cells in the laboratory. The protein elastin could be the base of a material that can be made into tubes that feel like real blood vessels. Some day, petroleum-based products might be replaced by materials produced by proteins synthesized by organisms.

The commercialization of such biomimicry is years away. But with each step, biologically based microscopic components draw closer. ▀

Forster is a freelance writer based in Boston.



How to Tell Your NAS From Your

Storage-area networks are powerful but costly and hard to implement. Network-attached storage is comparatively inexpensive and easy but limited. Here's how IT managers are tackling the strategic but complicated question of how best to manage their storage.

By Tommy Peterson

WAI CHONG MANAGES information systems at a health maintenance organization in California. Mark Silva is vice president of network operations at a large Boston investment firm. Mark Dahl is the distributed systems manager at the Anchorage, Alaska, subsidiary of a global oil company. Each is responsible for very different kinds of data, but all must store rapidly increasing amounts of information. Each is looking to networked storage to solve that problem.

That means they're grappling with whether to choose relatively inexpensive, easy-to-implement network-attached storage (NAS) or storage-area networks (SAN), which are potentially more powerful but also more expensive and harder to implement.

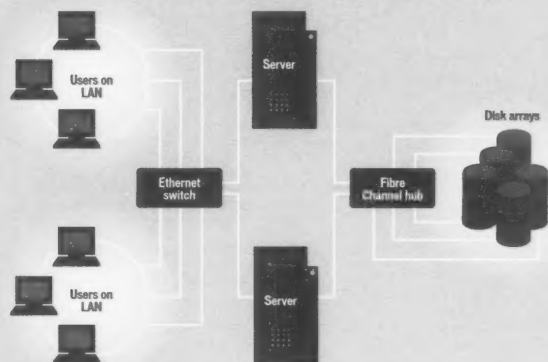
Managers tend to go with NAS if they have tight budgets, need to bring more storage online quickly and work at firms leery of fast-changing technology.

SANs are more appealing to companies that need fast data access for widely distributed users and have the money to make long-term investments in their storage infrastructures.

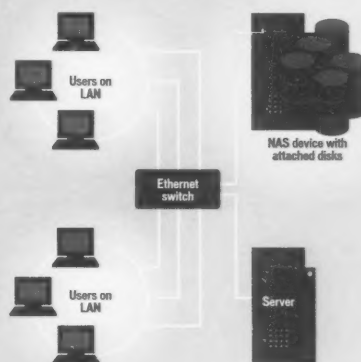
Information technology managers must weigh cost against ease of implementation and management, speed of data access, scalability, backup and fail-over capabilities and interoperability with other parts of the network. The decisions will become more urgent as the Internet and applications such as customer relationship management and enterprise resource planning generate more customer data.

Even when IT does decide on a strategy, manage-

A SIMPLE STORAGE-AREA NETWORK (SAN)



NETWORK-ATTACHED STORAGE (NAS)



Elbow

ment must be convinced that the move is worth it. (See related story, page 28.)

NAS usually occupies its own node on a LAN, typically an Ethernet network. In this configuration, a single server handles all data storage on the network, taking a load off the application or enterprise server. By detaching storage from individual servers, it makes the data available to any user on the network. NAS is essentially plug-and-play storage that uses proven Ethernet and SCSI technology.

A SAN, by contrast, is a high-speed dedicated sub-network connecting storage disks or tapes with their associated servers. Although these components can be connected via other protocols, including SCSI or IBM's Escon optical fiber, they're associated with the emerging high-speed (133M to 4.25G bit/sec.), long-distance Fibre Channel protocol.

SAN technology is designed to support disk mirroring, backup and restoration, archiving and retrieval, data migration among storage devices and sharing of stored data among servers. SANs can also be configured to incorporate subnetworks such as NAS systems.

Weighing the Cost

Chong, an information systems manager at Omni Health Corp. in Sacramento, Calif., says he wants to implement a SAN to accommodate Omni's storage needs and its plans to give patients access to billing records over the Web. "A SAN is the best strategy for future needs," he says.

Earlier this year, Chong began talking to Compaq

Computer Corp. about building a SAN, but his bosses recently applied the brakes to the project, wanting more time to consider costs and the still-evolving SAN technology. Chong's situation is common.

"These are expensive decisions — I spend a lot of my time thinking about storage and trying to think about it strategically," says Silva, vice president for network operations at State Street Corp. in Boston.

Omni's 1 terabyte (TB) of data is currently stored on rack-mounted disks connected to individual servers via SCSI buses. This common approach is easy and relatively cheap. A Guardian 90GB SCSI RAID array from Seagate Technology Inc. costs about \$7,600, while NAS or SAN technology can cost hundreds of thousands or even millions of dollars. Storage can be increased merely by adding SCSI host bus adapter ports in the form of add-in cards to the server, daisy-chaining more devices off existing buses or adding servers — or all three.

However, each SCSI bus can support a maximum of 15 disk arrays, and each SCSI bus can stretch no farther than 75 ft. from the host.

Large storage needs can quickly translate into a dense jumble of hardware, with data accessible only through individual servers. To see data on other servers, users must go through the network — a process that's slow for the user and bogs down the network. In some cases, the user may not be able to see data without switching drives.

In addition, if any device needs maintenance, the entire string must be taken off-line.

On the other hand, "we can get a NAS box in a shipment at 9 in the morning, and it can be up and involved in production by noon," says Dahl, distributed systems manager at BP Exploration (Alaska) Inc., an Anchorage-based subsidiary of global oil company BP Amoco PLC.

"NAS is very stable technology," says Lauri Vickers, an industry analyst at Cahners In-Stat Group in Newton, Mass. "It provides a lot more scalability than conventional storage" but costs much less.

However, she adds, SANs have "the most strategic intelligence that can be applied best to large volumes of stored data."

The promise of SANs must be balanced against their comparatively high costs, as well as implementation and management headaches, say analysts.

"Ninety-one cents of every dollar spent on nontraditional storage, specifically for SANs, goes to management and maintenance," says Vickers.

Another negative is the question of interoperability. The Storage Networking Industry Association (SNIA) and the Fibre Alliance are engaged in an ongoing battle over Fibre Channel standards. The Mountain View, Calif.-based SNIA has support from Compaq, Sun Microsystems Inc. and other vendors, while the Fullerton, Calif.-based Fibre Alliance is backed by Hopkinton, Mass.-based EMC Corp.

Complex Needs

BP Exploration recently invested in both NAS and SAN technologies to accommodate almost 5TB of data on Unix and Windows NT platforms.

NAS technology is "way ahead" of SAN technology for usability and reliability, especially in cross-platform applications, says Dahl. However, he says, SANs let him allocate data to any free space on a storage network.

State Street's major storage requirements are for its online transaction service, which demands high availability but not huge capacity, and a growing 3TB data warehouse. The data warehouse must store large amounts of data but has comparatively lower uptime requirements.

Silva has added 800GB of StorEdge disk arrays from Sun while it evaluates SAN products. He has been talking to EMC and Mountain View, Calif.-based Veritas Software Inc. Silva says he has a lot of confidence in Veritas, but he says he isn't sure he can afford EMC's high-end products on his approximately \$2 million budget.

"If money weren't an issue, we'd go with EMC because we know they're solid products," says Silva. "Moving to a SAN, I do worry about interoperability and management issues." Those concerns lead some customers to stick with safe storage choices.

Earlier this year Dow Jones & Co., an investment

Continued on page 72

and publishing company in New York, spent about \$3.5 million in storage technology, most of it configured as NAS, according to senior systems administrator Marc Appelbaum.

"Dow Jones doesn't want to set the pace with a new technology," says Appelbaum. "This is a conservative company [that] is not going to take a risk on a technology that's not mature."

The 100GB of data being stored by Dow Jones includes customer preferences, archived stories from *The Wall Street Journal* and the backup for the Web version of the newspaper.

Dow Jones turned to Storage Technology Corp., a Louisville, Colo.-based vendor that deals in SAN products and tape storage devices, for both products and help implementing them. The primary storage device is the StorageTek L700 tape library, with 13.6TB capacity and Ultra SCSI (20M byte/sec. data-transfer) connections.

Appelbaum says his department is planning to set up separate Compaq StorageWorks SANs for individual business units that request them because they offer high-speed access to data.

Easier Choices

For some IT managers, the choice of SAN vs. NAS was easier.

Ken Ciaccia, information services project manager at Armstrong World Industries Inc., has implemented a NAS configuration. He says the Lancaster, Pa.-based flooring company is currently storing 628GB of data from its SAP AG applications, with another 28GB added every month. The SAP data is stored on EMC drives attached to the Armstrong LAN.

In addition, the company is moving to an imaging system and needs to store contracts and other documents in Portable Document Format.

"SAN is a technology that makes sense for applications where customers constantly have to access your data," Ciaccia says. "We have storage needs but not so much constant access needs."

John Stone, administration director at the Office of the Public Defender for the Ninth Judicial Circuit in Orlando, oversees the court records for two counties. Staff members in both his and the state attorney's office, as well as independent lawyers, need constant access to these files. Nine months ago, he implemented a SAN to provide faster access to data.

"We have over 240GB of storage capacity, [which] we don't really need all of right now, but we do need the speed that the storage network gives us," he says. "When you have six or seven hundred people trying to access data at the same time, you need a SAN, or they might as well go to lunch every time they try to get to a document file."

The court's SAN comprises one Compaq RAID Array 8000 Pedestal, two HSG80 array controllers, two Peripheral Component Interconnect-to-Fibre Channel adapters, two eight-port Fibre Channel switches, 15 9GB Ultra SCSI 10,000 RPM drives and six 18GB Ultra SCSI 10,000 RPM drives.

Another factor in Stone's decision to choose SAN technology was the electrical isolation the SAN allows for switches and controllers.

"We were looking for the most reliable and the fastest option, and this was what we chose," says Stone. "Everything is mirrored and striped on the drives. This provides everything, including hot backup, unless you lose the drive, and then all the data is mirrored."

After a "substantial" discount, Stone says, the court paid a little more than \$100,000 for the storage network. Even though Stone says he's satisfied with

NAS AND SAN COMPARED

	NETWORK-ATTACHED STORAGE (NAS)	STORAGE-AREA NETWORK (SAN)
Connectivity technology	Most applications are supported by SCSI, Ethernet and/or TCP/IP. Some NAS devices use Fibre Channel for increased speed.	Associated with Fibre Channel, but SANs can be supported by Fast Ethernet or SCSI-2. Use of Fibre Channel increases distance over which the network can operate, from approximately 25 m to 10 km or more.
Access to stored data	Provides access to stored data related to the NAS device to all users on a LAN.	Provides access to all online stored data to all users on a LAN. Provides cross-platform access to data.
Speed of access to data	NAS server frees some server resources and increases speed of access over conventional storage but still consumes network bandwidth.	Provides fastest access to stored data because storage traffic moves on its own network.
Allocation of storage resources	NAS distributes stored data to the devices on its node of the network.	SAN architecture allows storage to be distributed across servers and storage devices, allowing for most efficient use of storage resources.
Implementation	Essentially plug-and-play into node of existing LAN.	Complex installation. Users consistently report the need for much support before, during and after the installation. Few IT shops have internal expertise to build and maintain a SAN at present.
Cost	Advocates point to relatively low initial investment in hardware, software and implementation support.	Advocates claim that initial costs are balanced by higher performance, leading to lower cost over time.

GLOSSARY

Availability: The degree to which a computer system or network is available.

Bus: A physical transmission channel in a computer or on a network that carries signals to and from devices attached to the channel.

Disaster recovery: Preventive measures using redundant hardware, software, data centers and other facilities that either ensure that a business can continue operations during a natural or man-made disaster or helps restore business operations as quickly as possible.

Disk controller: Hardware that controls the writing and reading of data to and from a disk drive.

Disk mirroring: The creation of two copies of data on separate disk drives.

Disk striping: Spreading data across multiple drives and combining partitions from separate disks into a volume that the operating system recognizes as a single drive. Disk striping enhances performance by enabling multiple I/O operations in the same volume to proceed simultaneously.

Fabric: A Fibre Channel topology (in this case, linking storage units) that features

one or more switching devices.

Fail-over: The process by which data is immediately and nondisruptively routed to an alternate data path or device in the event of the failure of an adapter, cable, channel controller or other device.

Fibre Channel: Fibre Channel is nominally a 16 bit/sec. data-transfer interface technology, although the specification allows data transfer rates from 133M bit/sec. up to 4.25G bit/sec. Data can be transmitted and received at 16 bit/sec. simultaneously.

Fibre Channel Arbitrated Loop (FC-AL): FC-AL places up to 126 devices on a loop to share bandwidth. Typically, this is done using a star layout that is logically a loop, employing a Fibre Channel hub. This allows IT managers to add or remove devices without having to bring down the entire loop.

Host bus adapter (HBA): A SCSI-2 adapter that plugs into a host and lets that host communicate with a device. The HBA usually performs at the lower level of the SCSI protocol and is normally the initiator.

Hot swapping: The process of removing and replacing a failed system component while the system remains online.

Hub: A device joining communication lines at a central location, providing a common

connection to all devices on the network.

Interoperability: The ability of hardware and software made by a variety of different manufacturers to work seamlessly together.

Online transaction processor: Executes transactions the instant they're received by the computer and updates master files immediately.

Protocol: A set of rules or standards to enable computers to communicate.

SCSI: The standard set of protocols for host computers communicating with attached peripherals. SCSI allows the connection of as many as six peripheral devices.

SCSI bus: A parallel bus that carries data and control signals from SCSI devices to an SCSI controller.

Switch: A network device that selects a path or circuit for sending data.

Workload balancing: A technique that ensures that no data path becomes overloaded while others have underutilized bandwidth, causing an I/O bottleneck. When one or more paths become busier than others, workload balancing shifts I/O traffic from the busy paths to the less-busy paths, further enhancing throughput over the already efficient multipathing method.

the technology, his shop wasn't immune to the implementation hassles widely reported with SANs.

"[Compaq] got the technology, but you need to find the gurus to help you through the process," says Stone. "There wasn't a lot of knowledge in programming the Fibre Channel switches and the controllers [that allocate data among storage devices] here, and it took a while to find the people we needed to help."

Some predict the choices will become easier. Many industry observers say that the implementation headaches will fade as the distinctions between NAS and SAN fade. "The time will come when you won't

tell the difference," says Thomas Coughlin, an independent industry consultant in San Jose. "Users are going to insist that . . . SANs become easier to implement and cheaper to maintain and that NAS becomes more scalable and flexible."

Vickers says she agrees, to a point. "NAS and SAN features will converge, especially at the high-volume, high-price end, and will look like SANs with NAS devices as part of the storage network," she says. "But you're not going to want to centralize all your storage, which is the general direction. Low-end NAS will continue in that form." ■

CARNIVORE:

How Much Bite Behind the Bark?

Many are skeptical of FBI claims that its surveillance tool can target only the e-mail of suspects. Meanwhile, several vendors are offering ways to secure corporate data.

By Ann Harrison

WHILE THE DEBATE rages over whether the FBI should be allowed to attach its Carnivore surveillance system to networks run by Internet service providers, many experts are skeptical of FBI claims that Carnivore can look for suspicious e-mail and Internet traffic without violating the privacy of innocent people.

"What the Carnivore project has to do is look at all the packets, and there is no way it can do what it claims to do, which is only save [the] packets for which it has a court order," says Susan Landau, a senior staff engineer at Sun Microsystems Inc. and co-author of the book *Privacy on the Line: The Politics of Wiretapping and Encryption*.

Both the American Civil Liberties Union and the Electronic Privacy Information Center have filed Freedom of Information Act requests seeking more details and source code on Carnivore, but the FBI says it's unlikely to provide such information.

Robert Corn-Revere, an attorney at Atlanta-based Internet provider EarthLink Inc., which resisted the installation of Carnivore, testified in April before the House Constitution Subcommittee that federal marshals who first approached the company identified the product as EtherPeek, a packet sniffer sold by Walnut Creek, Calif.-based AG Group Inc.

While the FBI has since declined to comment on Carnivore's roots, it acknowledges that the tool is a version of a commercial Windows 2000 application that has been customized to intercept and view only the e-mail, Web browsing activity or other Internet traffic of a person named in a court order.

Critics such as Landau argue that because Carnivore must scan all the packets moving over a network to find those it wants to examine, there is still room for abuse.

"Carnivore has to scan a lot of messages for which it does not have court authorization. What if Carnivore sees a lot of traffic between two companies that could signal an impending merger or acquisition?" asks Landau. "Should law enforcement agents be privy to that kind of business information?"

Analysts say the FBI's claim that it monitors only selected traffic is bolstered by the fact that data chosen for analysis is stored on Iomega Corp. removable Jaz diskettes, which can hold 2GB per disk. If the FBI were doing more widespread searches, analysts say, they would expect the data to be stored on higher-capacity devices.

Fine Filtering

The agency's claims are also helped by the fact that EtherPeek — if it is the foundation of Carnivore — can filter packets based on specific criteria, such as an individual's IP address.

According to the AG Group Web site, EtherPeek is a 32-bit Ethernet packet-level network traffic protocol analyzer and debugging tool designed to capture packets on an Ethernet network or a switched network such as the Internet.



Anyone who knows the networking protocol... would have no difficulty at all writing a packet sniffer.

LANCE COTTRELL, PRESIDENT,
ANONYMIZER.COM



EtherPeek includes an application called EtherHelp that appears to have the same capabilities as those the FBI claims for Carnivore. EtherHelp captures "all network traffic or a specific portion of that traffic in the form of packets," according to the product data. "Packets captured are not displayed in EtherHelp but can be saved in a file, which can then be forwarded to support personnel for analysis by EtherPeek, which can then display the saved packets."

The FBI has declined to say how Carnivore works, and AG Group declined to comment on Carnivore.

Still Wary

Some critics remain unconvinced, saying tools such as EtherPeek and Carnivore can easily be misused.

Unlike the telephone system, which routes calls over dedicated circuits, the Internet is a packet-switched network, where data packets from different users are interspersed on the same circuit. "Trap-and-trace" and "pen register" orders allow investigators to use packet sniffers to collect e-mail addresses, header information, dial-up numbers, e-mail logs or IP addresses.

The technology could also be used to track the identities of all users who access a particular Web page. Analysts say the ability to monitor packets also gives investigators access to the content of e-mail messages that can be scanned by other filtering tools for certain header content or keywords.

"Anyone who knows the networking protocol of whatever operating system [targeted individuals] are using would have no difficulty at all writing a packet sniffer," says Lance Cottrell, president of Anonymizer.com, which offers services to mask the identity of e-mail and Web surfers.

Information technology managers worried about securing data from tools such as Carnivore can turn to a number of products and services that promise to shield data from electronic dragnets.

Anonymizer.com, for instance, offers an anonymous e-mail service, dial-up accounts, Web publishing services and Web address encryption that sets up an encrypted connection with the Secure Shell tunneling protocol, preventing a provider, network administrator or other intermediary from reading the addresses of Web sites a user visits. ■

Services That Can Protect Your Data

Anonymizer.com

The site offers free anonymous e-mail, anonymous Web browsing and Window Washer services that remove cookies from browser and system files. Premium services include fast anonymous Web browsing for \$5 per month, anonymous Web publishing for \$29.99 per month, anonymous dial-up services for \$59.99 for three months, a more complete version of Window Washer for \$29.95 and server licensing and Secure Shell/SecureCRT services that set up encrypted tunnels for surfing, e-mail and news traffic for \$29.99 for three months.

Zero-Knowledge Systems Inc. www.zeroknowledge.com

The site offers the Freedom client/server software that encrypts and reroutes Internet traffic. It allows users to create multiple digital identities, or nym, that they can associate with different Internet activities. The nym, with their unique encryption keys and digital signatures, allow for private e-mail, Web browsing, news feeds, chat and Telnet. The software costs \$49.95.

HushMail www.hushmail.com

Users connect to the HushMail site for e-mail services using the Secure Sockets Layer encryption protocol, which can't be monitored. Messages sent between HushMail users are automatically encrypted by the user's browsers with the person's 1,024-bit private key. The service is free.

Pretty Good Privacy (PGP) www.pgp.com

The PGP public-key cryptography system is the de facto standard for secure e-mail and file encryption on the Internet. Used by more than 4 million people, it can add digital signatures to messages to guarantee their authenticity and data integrity. Plug-ins are available for many popular e-mail clients. The PGP Data Security Suite costs \$144 per seat.

Start-up Takes Pain Out of Transactions

CommerceRoute helps business partners exchange data over the Internet

BY AMY HELEN JOHNSON

ERICKSON SHIRLEY, CEO of CommerceRoute Inc., aims to make his company the Ma Bell of the value chain. The Emeryville Calif.-based company wants its service to be on every company's list of basic communication needs alongside phones and an Internet connection.

"We hook up a company to its trading partners and they don't have to do anything," he says. CommerceRoute's niche is enabling external business partners to trade billing, orders and other information automatically over the Internet.

The data arrives at CommerceRoute's server, which makes any necessary data conversions before routing it to the recipient.

The service's translation capabilities let customers maintain records in their own data formats. And a company can program CommerceRoute's service to act on a set of business rules, such as checking inventory or starting a manufacturing request, adding workflow to the data translation and exchange process.

Leaving Costs Behind

Companies can license the software and install it on their own servers, but CommerceRoute promotes its GlobalConnect service, run with Intel Corp.'s Online Services, as the least intrusive and most valuable option. Both options allow companies to leave behind the costly maintenance of hard-coded connections between themselves and their partners, says Shirley.

John S. DeSimone, a senior analyst at Boston-based research firm The Delphi Group, says that CommerceRoute's open architecture makes it flexible and scalable, enabling it to be customized into many environments.

Shirley says CommerceRoute's value increases with

the number of trading partners a company has. CommerceRoute has a business-to-business, Internet-based approach, however, so linking legacy systems isn't its forte.

At Escalate Inc., a Redwood Shores, Calif.-based application service provider that runs

e-commerce sites, Haiyan Song, senior director for applications and services, installed CommerceRoute to facilitate file mapping among Escalate, its customers and their partners for information such as purchase orders and order status. Each organization uses its own data formats, and Escalate translates them into a standard description using XML.

Song says she chose CommerceRoute because of its

mapping and workflow capabilities. She says it was simple and straightforward in comparison with systems from other vendors that attempted to attack full-scale, sophisticated, enterprise application-integration problems.

With CommerceRoute, arriving data can trigger a process based on business rules. For example, a return could generate an order to the accounting department to cut a refund check, add one item to the inventory total and label the shipping and packaging costs as write-offs.

Escalate is still weeks away from production using CommerceRoute. In Phase 2, Song will bring online the product's workflow capabilities to model and monitor the data integration process.

Workflow Piece is 'Dynamite'

Workflow is the main reason Chris Veal, head of special projects at Ernst & Young International in New York, is working with CommerceRoute. His plan is to link the company's auditing customers through CommerceRoute, allowing auditors to check the books more frequently and travel less often. The workflow piece is "dynamite," he says.

A drag-and-drop modeler allows Veal to describe the firm's processes in terms of workflow and then deploy the workflow schema directly using the CommerceRoute engine to map the diagram into business rules.

CommerceRoute has only a handful of major installations, but it claims that several Fortune 500 companies are running confidential pilot projects. These are the blue-chip customers with complex business-partner arrangements that it needs to cultivate to be successful, says Shirley.

Ilan Sehayeck, CommerceRoute's vice president of product strategy, says the vendor plans to support wireless protocols. And the company is building workflow tools so trading partners can program CommerceRoute to handle transaction exceptions such as partial invoicing.

Johnson is a Computerworld contributing writer in Seattle. She can be reached at amyhelen@pobox.com.

the buzz

STATE OF THE MARKET

Another Link in The Chain

CommerceRoute is riding a wave of interest in automating supply chains and creating digital marketplaces, both of which endeavor to make the sales, payment and fulfillment parts of a business more efficient through automation.

UBS Warburg in London predicts that \$2 trillion worth of goods and services will be bought this way by 2004 and that the vendors that supply the infrastructure could realize revenue of \$30 billion.

But don't think of CommerceRoute as just a way to link external partners, says John S. DeSimone, a senior analyst at The Delphi Group. In many companies, it's a way to improve data exchange and process integration among business units or departments.

The 80/20 Rule

Either way, the project won't likely be plug-and-play, warns DeSimone. CommerceRoute can solve 80% of an integration problem out of the box; the other 20% will be so specific to a company that customization will be necessary.

That was the experience at Escalate, says Haiyan Song, senior director for applications and services. Her team spent time tuning the CommerceRoute product to work with custom XML document-type definitions that Escalate had written. But she says she anticipated that because companies use highly specific data and processes.

CommerceRoute CEO Erickson Shirley says the company is aware that customers need to tailor their data mappings and business rules.

He says one target market in particular requires customization: business-to-business exchanges. A lot of them reflect the processes inherent in their particular fields. There's no way for a vendor like CommerceRoute to incorporate those unique processes into an application that works out of the box, so the better strategy is to create tools that make it easy to perform that customization.

Future versions of CommerceRoute will have improved process-design tools, he says, and even collaborative tools so all the participants in a relationship can work together to build the workflow.

CommerceRoute might be better off if it partnered to add functionality to its future products, says DeSimone. The company needs to identify potential partners that enhance its original product, he says. If a pure partnership won't fly, then another strategy to consider is a merger. — Amy Helen Johnson



ILAN SEHAYECK AND ERICKSON SHIRLEY want CommerceRoute to be seen as a provider of essential communications services

CommerceRoute Inc.

Location: 6425 Christie Ave., Suite 325, Emeryville, Calif. 94608

Telephone: (510) 601-6061

Web: www.commerceroute.com

The technology: Lets partners exchange data such as billing information over the Internet and performs the required translations.

Why it's worth watching: The service lets companies continue to use their own internal protocols and data formats. Customers pay only for transferred data.

Company officers:

- Erickson Shirley, co-founder, chairman and CEO
- Doron Rotem, co-founder and chief technical officer
- Ilan Sehayeck, co-founder and vice president of product strategy

Milestones:

- 1998: Company founded
- 1999: CommerceRoute suite launched
- 2000: CommerceRoute 1.5 re-

leased; GlobalConnect service debuts

Employees: 50; 125% annual growth

Profitability date: 2002

Burn money: \$6.7 from angel investors; \$20 million in third-round funding under way

Pricing: CommerceRoute 1.5 starts at \$100,000; CommerceRoute GlobalConnect service pricing varies

Customers: Escalate, Ernst & Young International and Microsoft Corp.

Partners: Arthur Andersen LLP and Intel

Red flags for IT:

- CommerceRoute customers still have to link legacy systems.
- The products aren't yet mature; users may see glitches like data-type hiccups and clunky administrative tools.

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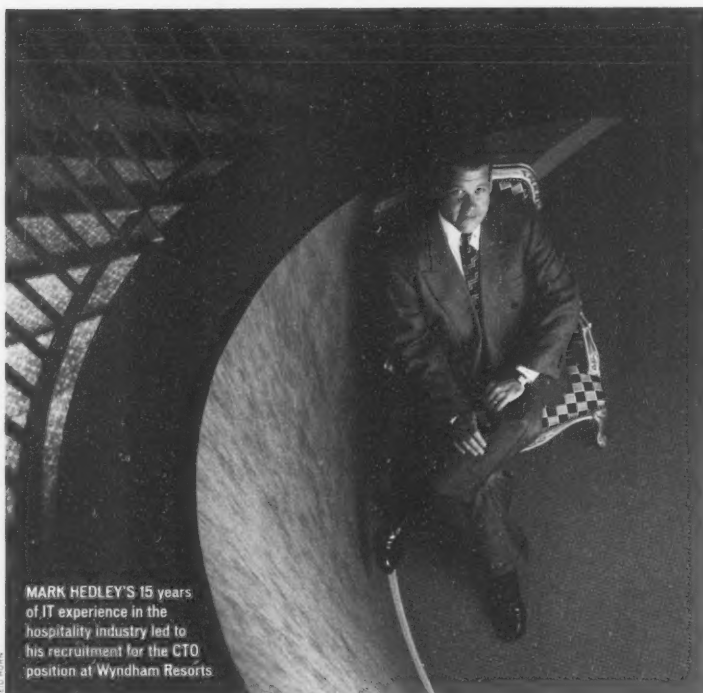
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MARK HEDLEY'S 15 years of IT experience in the hospitality industry led to his recruitment for the CTO position at Wyndham Resorts.

Chief Technology Officer: One Title Fits All

More and more companies are hiring chief technology officers. But just what do these new roles really involve? By Zachary Tobias

AS TECHNOLOGY becomes a more important part of what virtually all businesses do, some companies are finding that there's too much work for a single CIO to handle. Many firms are dividing technology-related tasks among CIOs, chief architects, telecommunications executives and, increasingly, chief technology officers (CTOs).

Trying to distinguish among these positions can be tricky, since each company faces its own industry-specific chal-

lenges in organizing its information technology team. But a CTO's job almost always involves "looking out there on the horizon for what technologies could... be used by that company," says Beverly Lieberman, president of recruiting firm Halbrecht Lieberman Associates Inc. in Stamford, Conn.

Here's one recently christened CTO who has to keep his eyes on the horizon and beyond.

Mark Hedley
Senior vice president and CTO
Wyndham International Inc.

Dallas
www.wyndham.com
Wyndham International is a luxury hotel company with 130 locations.

Previous experience: Hedley already had 15 years of IT experience in the hospitality industry when he was approached by a technical recruiter for Wyndham. However, he had never held the title of CTO before joining the company in April.

He began his career as a systems analyst at Sheraton Hotels & Resorts, a subsidiary of White Plains, N.Y.-based Star-

wood Hotels & Resorts Worldwide Inc. Hedley later moved to the gaming industry and became CIO at Caesar's World Inc. in Baton Rouge, La. He was most recently vice president of IT at Sun International North America Inc. in Fort Lauderdale, Fla.

These jobs gave Hedley the know-how he says he needs: proficiency in Internet technology, data networking, reservation systems, and the nuts and bolts of how a hotel works.

Responsibilities: When Hedley became a CTO, the "homework became greater," he says. He spends one to two hours per day reading up on the latest technologies in the hospitality industry, which he says change every three to six months.

"As a CTO, my job is to research the newest technologies and evaluate them for potential use in doing what we do best: providing a fantastic customer experience," he says.

A critical part of Hedley's job is to ensure the best use of customer information. He oversees Wyndham By Request, a customer relationship management system that collects data about the hotel's guests to provide individually tailored service. At the company's Web site, customers can register their preferences for feather pillows or a good cabernet, for instance—which then seem to magically appear when the customers arrive.

"To a great extent, you have to understand the business process in order to use technology to support it," Hedley says, explaining his need to be involved in the everyday operations of the company. At the same time, with no CIO on its payroll, Wyndham relies on Hedley to take care of the back room as well to make sure information flows smoothly within the company.

For example, when he first arrived at Wyndham, Hedley says, outdated computer systems made it hard for executives to access their e-mail while on the road. "Within the first couple of weeks, I recognized the need and identified the technology" to improve the system, he says.

Rewards: Hedley declined to disclose his salary, but Lieberman says that how much a CTO earns largely depends on how a firm's IT team is organized. In some companies, the CTO

reports to the CIO. In such cases, if the CIO of a Fortune 500 company makes \$500,000 per year, the CTO earns \$250,000 to \$350,000, she says. But in situations where the two are peers or where a CTO has supplanted the CIO altogether, like at Wyndham, salaries for the two positions are about the same.

But Hedley says it's his role that he really values. "I enjoy working with an exciting team of people who seek out technological solutions, where I don't have to fight to get them implemented," he says. ■

Tobias is a freelance writer in Santa Cruz, Calif.

Just the Facts

■ **Name and job title:** Mark Hedley, senior vice president and CTO

■ **Company:** Wyndham International Inc., Dallas

■ **Nature of work:** Oversees the company's customer relationship management system, as well as the back-office network.

■ **How he got the job:** Recruiters sought him out because of his substantial IT experience in the hospitality industry.


■ **Skills required:** Knowledge of Internet technologies, data networking and hotel reservation systems, plus firsthand knowledge of the hospitality industry.

■ **Training:** Although he has 15 years of IT experience, Hedley says he can't point to any specific training he received to land the job; he just has "a love of technology and a desire to help others solve problems," he says.

■ **Salary potential:** Just less than what a CIO can earn. If the CIO of a Fortune 500 company earns \$500,000 per year, the CTO will earn \$250,000 to \$350,000, according to Beverly Lieberman, president of recruiting firm Halbrecht Lieberman Associates.

■ **Career path:** The position involves virtually all facets of IT as it's used in the hospitality industry and also offers opportunities to "help steer business strategy," says Hedley. He says the future is only limited by one's drive and ambition. "In the future, I see myself as the CEO of a company that provides technology solutions to the hospitality and tourism industry."

■ **Advice:** Understand the business goals and become part of the group that establishes the company's vision, reevaluate technology standards and potential solutions to business issues every three months, and stay on top of innovations. — Zachary Tobias



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Reply by resume only to Colorado Department of Labor & Employment, Employment Programs, Attn: Jim Shimada, Tower 2, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to job order number: CO4667522.

Systems Analyst for mfg.developm/ates company of medical diagnostic equipment in Salt Lake City, UT. Job duties: custom design & implementation of an enterprise-wide PACS (Picture Archiving & Communication System) solution; analysis & optimization of clinical workflow in the department; hospital & enterprise; installation & configuration of several PACS components; imaging database & archive systems; diagnostic workstations; quality control stations. Web based image distribution systems & others; integration of preexisting legacy products into the PACS solution; integration & workflow management via HIS/RIS connection using HL7/DICOM custom design; coordinate operations to assure a smooth transition from a film based environment to filmless operations; interface with company or other OEM as required to support IM products. Must be willing to travel as needed to implement/configure the PACS. Project Tools used: PACS, HL7, DICOM, HIS/RIS, Unix, Windows NT, C++, BS (or foreign equivalent as determined by a credential evaluation agency) in Comp. Eng. or Comp. Sci. & knowledge and/or background in Medical Informatics & computing, HIS/RIS Systems, HL7, DICOM, Unix, Windows NT Server & workstations, C++, & PACS as verified by employer or professor testimonial. 40 hrs/wk, \$60,000-65,000, Mon-Fri, \$52,000/00/yr. Send resumes to Department of Workforce Services, Attn: Pat Redington, Job Order K3081034, 140 East 300 South, SLT, UT 84111.

IT Professional required in Little Rock, AR for (A) or (B) or (C) or (D) or (E) (A) Design, implementation, maintenance, Security, Backup/Recovery and testing of (i) LAN/WAN/Enterprise NW and (ii) MS Exchange, Web server, Terminal Servers, Desktop Deployment & Software Distribution. (B) Visual Studio, Java, C++, Oracle, Dev2000, MTS, S/MQ, DCOM, ActiveX, SQL, DBA, MCSO, DCP, (C) HTML, SCJP, DHTML, MCP, ASP, XSL, CSS, MCSO, MCP, (D) COBOL, CICS, DB2, IMS, VSAM, TCL, PL/I, DBA, S/370, ES9000, ADABAS, Natural; (E) ERP systems - SAP, ORACLE, PEOPLESOFT, BS or MSOR foreign degree equivalent/with 2yrs experience Travel required. Please send resume & salary request to: HR, Protech Solutions, Inc., 124 West Capitol, Suite 550, Little Rock, AR 72201 or HR@protechsoft.com

Programmer Analyst with B.S. in one of the following: Computer Science or Mechanical Engineering + 2 yrs. prior experience as a computer programmer. \$55K per year, 8:00 am - 5:00 pm, 40 hrs/wk. Consult with client companies to determine their requirements. Develop specifications, analyze, test, implement & document computer applications. Convert specifications into detailed instructions for coding. Evaluate user requests for new & modified programs; formulate plans and convert specifications using C, C++, Visual Basic 4.0, 5.0 & 6.0, JavaScript, VBScript, HTML, ASP 2.0, Oracle 7.x & SQL Server 6.5/7.0. Must have proof of legal authority to work in the United States. Send your resume to: Iowa Workforce Center, 902 W Kimberly Rd., Davenport, IA 52806-5783. Please refer to Job Order IA1101083. Employer paid advertisement.

Programmer Analyst (Colorado Springs, CO) - Bachelor's degree or foreign equivalent in Business Administration or Computer Science 2 yrs. exp. the job offered. Work under supervision as follows. Analyze user requirements, procedures and problems. Convert project specifications into sequences of detailed instructions and logical steps. Coding, design, develop, and implement computer applications. Document computer programs. Data analysis, code reviews, quality assurance activities, code acceptance and maintenance of software modules. Utilize COBOL, DB2, CICS, IMS Database, JCL and MVS. 40 hr/wk. Salary \$47,000.00 per year. Application by resume ONLY to Colorado Department of Labor & Employment, Attn: Jim Shimada, Office of Employment Programs, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, Colorado 80202-2117, and refer to Job Order Number CO4669636. NO PHONE CALLS PLEASE. Must have proof of legal authority to work in the U.S.

Lead Systems Programmer

Wanted by Life & Health Insurance Co. in Galveston, TX. Must have BS in Comp

Sci & 5 yrs prgm exp.

Respond to: HR Dept,

American National Insur-

ance Company, One Moody

Plaza, Galveston, TX

77550.

Database Admin, Oracle (South-
east, MI) MSX International, Inc.
seeks an experienced Oracle
DB Admin. for its suite of Oracle
applications to perform maintenance
& support; optimize performance,
provide technical support for development activities.
Req. M.S. CS or related,
min. 2 yrs exp. as Oracle DBA.
Exp. may be gained prior to M.S.
degree. Competitive salary
DOE. Send resume to MSX International, ref. job code CMX-
LR-GC, by fax to 248-829-6080
or to recruiters@msx.com.

Database Manager wanted by
Software Solutions Co. in
Cincinnati, OH. Must have
Masters in Comp Sci, Comp
Engg, Statistics & Comp Sci & 2
yrs database exp. Respond to:
Ginger Cohen, Director of
Operations and Development,
COIR-Psychiatry Professional
Services, Inc., 425 Oak Street,
Carrington House, Cincinnati, OH
45219.

SAP Administrator wanted
by Cosmetics Co. in
Romeoville, IL. Must have

MS or equiv in Comp Sci or
Comp Engg & 6 yrs comp

exp. Respond to: HR Dept,

Ulta Cosmetics Sales, 1135

Fragrances, Inc., 1135

Arbor Dr, Romeoville, IL

60446.

Software Engineer sought by
University Research
facility in Los Angeles, CA.
Involved in developing
software to utilize graphical
visual displays of data
structures to demonstrate
school-base public ac-
countability. Must have
Masters Degree in Computer
Science or any
Engineering field. Respond
to: Dr. James Abadi,
University of California-Los
Angeles, CSC/Cressi, 300
Charles E. Young Drive
North, Los Angeles, CA
90095-1522.

Call your
ITcareers Sales
Representative
or Janis Crowley.
1-800-762-2977

Sr Software Engineer sought by
information technology consult-
ing company in Englewood, CO,
to work in Englewood & other
unanticipated job sites in the
U.S., to, at a senior level, design,
develop, & administer
client/server & web-based soft-
ware applications that incorpo-
rate ORACLE relational data-
base management systems &
various middlewares. Analyze re-
quirements. Create designs &
design documentation. Engage
in application & performance
tuning & backup & recovery Use
JAVA, C++, C, & Pro*C in the
design & development process.
Requires Master's, or foreign de-
gree equivalent, in Computer
science or related field; 2 yrs ex-
perience designing & developing
software applications that incor-
porate ORACLE relational data-
base management systems;
Working knowledge of JAVA &
C++ \$66,100/yr. M-F: 8am-5pm
(2 openings) Respond by re-
sume to James Shimada, CO
Department of Labor & Em-
ployment, Tower II, #400, 1515 Ara-
pahoe St., Denver, CO 80202, &
refer to Job Order No.
CO4670421.

Programmer Analyst (Colorado
Springs, CO) - Bachelor's de-
gree or foreign equivalent in
Computer Science 2 yrs. exp. the
job offered. Works under su-
pervision as follows. Analyze
user requirements, procedures
and problems. Convert project
specifications into sequences of
detailed instructions and logical
steps. Coding, design, develop,
and implement computer ap-
plications. Document computer
programs. Data analysis, code
reviews, quality assurance ac-
tivities, code acceptance and
maintenance of software mod-
ules. Utilize COBOL, DB2, CICS,
PL/I, IMS, and JCL. 40 hr/wk.
Salary: \$45,000 per year. Ap-
plication by resume ONLY to Co-
lorado Department of Labor &
Employment, Attn: Jim Shimada,
Office of Employment Programs,
Two Park Central, Suite 400,
1515 Arapahoe St., Denver, CO
80202-2117, and refer to Job Or-
der Number CO4669639. NO
PHONE CALLS PLEASE. Must
have proof of legal authority to
work in the U.S.

Programmer Analyst (Colorado
Springs, CO) - Bachelor's de-
gree or foreign equivalent in
Computer Science 2 yrs. exp. the
job offered. Works under su-
pervision as follows. Analyze
user requirements, procedures
and problems. Convert project
specifications into sequences of
detailed instructions and logical
steps. Coding, design, develop,
and implement computer ap-
plications. Document computer
programs. Data analysis, code
reviews, quality assurance ac-
tivities, code acceptance and
maintenance of software mod-
ules. Utilize COBOL, DB2, CICS,
PL/I, IMS, and JCL. 40 hr/wk.
Salary: \$45,000 per year. Ap-
plication by resume ONLY to Co-
lorado Department of Labor &
Employment, Attn: Jim Shimada,
Office of Employment Programs,
Two Park Central, Suite 400,
1515 Arapahoe St., Denver, CO
80202-2117, and refer to Job Or-
der Number CO4669639. NO
PHONE CALLS PLEASE. Must
have proof of legal authority to
work in the U.S.

Sr. Software Engineer sought by
software products & services
company in Englewood, CO, to
work in Englewood & other
unanticipated job sites in the
U.S., to, at a senior level, design
& develop telecommunications
industry computer software ap-
plications or modules that incor-
porate multi-tier architecture &
access ORACLE relational data-
base management systems. An-
alyze user requirements, en-
gage in design analysis, manage
development & delivery of soft-
ware. Design, code, test & debug
the applications or modules. Use
C++, Dcom, & Object Oriented
Design techniques in the devel-
opment process. Requires Bac-
chelor's in Computer Science, 2 yrs
experience designing & devel-
oping computer software ap-
plications that access ORACLE
relational database management
systems using Object Oriented
Design techniques. \$66,100/yr;
M-F: 8am-5pm. Respond by re-
sume to James Shimada, CO
Department of Labor & Em-
ployment, Tower II, #400, 1515 Ara-
pahoe St., Denver, CO 80202, &
refer to Job Order No.
CO4670035.

Computer Systems Analyst-De-
sign, develop, and implement
computer systems and pro-
cedures using SAS programming
tools for the transfer of data and
the generation of reports, data
sets, and analyses. Code, test,
document, modify, and enhance
SAS macros and programs. Day
shift. Competitive salary and
benefits. Bachelor's degree in
Computer Science. Resumes for
Computer Task Group, Attn: E.
Peckham, R&W File #1886.20,
5875 Casle Creek Parkway, In-
dianapolis, IN 46250.

Programmer Analyst-Bach-
deg in engg (any), math, sci
& 2 yrs exp in job. Analyze,
dsign, dvlp database applis
using Power Builder 4.0,
Oracle Forms, Developer
2000, Unix & SQL.

Respond to: Softpro Inc,
3265 Shoal Creek Lane 2B,
Hillard, OH 43026.

Data Processing &
Telecommunications prof.
Including Project leaders,
A/P and Systems Analysts
specifically with SAP,
JAVA, CODA, GSM wire-
less telecommunications
exp. To work in consulting
environment. Contact
human resources at
(626) 405-1103 or e-mail
recruit@abraxasla.com.

NEED
TO
HIRE.
START
WITH
US.

ITcareers and
ITcareers.com
reach more than
2/3 of all US IT
workers every
week. If you
need to hire top
talent, start by
hiring us.

Call your
ITcareers Sales
Representative or
Janis Crowley at
1-800-762-2977.

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just better

ITcareers.com

Trusted by more hiring managers than
any IT space in the world.

Soft. Dgn Co. seeks Senior C++ Developer. Analyze, design, develop, implement, test, & ongoing maintenance of CSAT internet/intranet app initiatives; position involves lead tech resp incl project mgmt & cross-functional teams; use MS Internet Dvlpmt tools like VB Script, HTML, MS IIS; req MS in CIS/MS or equiv progressive work exp in various technologies, incl client server, mainframe & web technologies. Respond to Mr. Sharad Karkane, Director, Corporate Software & Technology, Inc., 2 Edgewater Drive, Norwood, MA 02062 email: sharad_karkane@corpsoft.com

Software Engineers (multiple positions) wanted by Info Technology & Engg Services Co. in Yardley, PA. Must have Bach in Comp Sci, Engg or equiv & 3 yrs comp exp.

Respond to: HR Dept, Global Systems Technologies, Inc., 109 Floral Vale Blvd, Yardley, PA 19067.

Software Engineer wanted by Provider of Tele/Computer & Networking Solutions Co in Amherst, NY. Must have Bach in Elec Engg or Comp Sci.

Respond to: HR Dept, VoCal Technologies, Inc., 200 John James Audubon Pkwy, Amherst, NY 14228.

Software Engineer Design, development, testing and implementation of commercial/business application systems. Must have demonstrated ability Object Oriented Design & Development using C++, VC++, COM object & ATL, demonstrated ability in using RDBMS (SYBASE), SQL Server, and demonstrated ability working on Windows NT. Req 2 yrs exp as a Software Developer/MS in Computer Science, Math, Engg or related field. Salary is \$80,000/yr. 40 hrs/wk, 8:00 to 5:00 pm. Send two copies of resume to Job Order #19993407, Labor Exchange Office, 19 Stanford St., 1st Floor, Boston, MA 02114.

Software Engineer wanted by Co involved in developer analysis, monitoring & cardiac info systems in Melbourne, FL. Must have Bach or foreign equivalent in Comp Sci or Engg & 2 yrs exp dvlpg C++ software. Respond to: Witt Biomedical Corporation, 295 North Dr, Ste H, Melbourne, FL 32934.

Systems Analyst wanted by Computer Consulting Co in Woodbridge, NJ. Must have Bach in Comp Sci/Comp Engg/Math/Physics or Comp Info Systems & 1 yr s/ware related exp.

Respond to: HR Dept, U & X Group, Inc., 1000 Route 9 North, Ste 203, Woodbridge, NJ 07095.

Programmer Analyst wanted by Bellerose, NY Co. involved in Sale of Computer H/W & S/ware. Must have MS in Comp Sci & 2 yrs exp researching, dvlpg, dsngng & adapting s/ware prgm systems applying principles & techniques of comp sci. Respond to: Marty, Aqua Systems, Inc., 247-39 Jamaica Ave, Bellerose, NY 11426 or fax resume to: 718-347-2802.

Payless Enterprises, Inc. a NY IT Co. is looking for Exp. Software Engineers hvng Mast Degrees or Bach Degree w/5 yrs exp. Exp. must include combinations of Unix, C, C++, Oracle and Win NT. Send resumes to: HRD, Payless Enterprises, 252 Old Country Road, Hicksville, NY 11801.

Programmer Analyst, Bedford, MA. Analyze & develop database applications using Web Technologies, SQL Server database design and Crystal Reports. Develop Web pages using ASP technologies, Active Controls and DLL's using Visual Basic. Req 4 Bachelors in Comp. Sci. or Engg or Math. 1 yr exp in job offered or 1 yr exp in any computer related profession. 40 hrs/wk, 9a-6p, \$55,000/yr. Applicants should submit two (2) copies of resume in response to Case #20001847, Labor Exchange Office, 19 Stanford Street, 1st Floor, Boston, MA 02114.

Programmer Analyst: Dgn, dvlp & implant application software using Adabas, Natural 2.1, 2.2 in reporting/structured models. Predict, JCL, TSO, ISPF on IBM mainframes. Plan, dvlp & test prgms. Req 2 Yrs exp in job offered or 2 Yrs exp as Prgrmr or related pos w/same duties \$85 in Job. Or w/related field \$60K/yr. EOE. Send resume to Shiva Systems 635 Anderson Cir., #109 Deerfield Beach FL 33441.

Computer Engineer wanted by Computer Consultancy & Software Dvlpmt Co in Miami-Dade, FL. Must have Bach in Comp or Info Sci & 2 yrs exp dsngng s/ware comp network systems using datalax 2.xx 3.xx for DOS & Win Environments.

Respond to: HR Dept, Microtel, Inc., 12221 SW 99th St, Miami, FL 33186.

Career opportunities with Indus International Associates, Inc. Atlanta, GA. Positions available for Jr. and Sr. Analysts/Programmer/Developers. Plan, design, develop & maintain IT applications. Analyze/Develop new and existing applications/programs, procedures, prepare, design, code, debugging, testing systems. Ideal candidates should have either of skills: C, C++, UNIX, VB, Java, SAP, MM/SD/ABAP, any other ERP Mainframe, Client/Server applications exp. Perfomance Database/Systems Admin, and Data warehousing. Req. Master's or Bachelor's degree in Computer Sci., Eng., Bus. Adm., Math or related, and to 5 yrs exp. Please fax resume w/ salary requirements to 678-406-0409 or email at hr@indus-us.com.

Full-time Web Systems Developer responsible for generating the project/feature requirements, functional specifications, design consolidation, development, unit testing and maintenance using C++, JavaScript, Java, OO, NT, MFC, UNIX, HTML, Winsock2, COM, BSD Sockets, and Windows Scripting. Interface with the quality assurance team for integration testing and interfacing with the architecture team for appropriate phases of the project/feature cycle. Must have a Bachelor's degree in Computer Science. Foreign degree equivalent acceptable. Must have 2 years of experience in the job offered or three years of experience in a position with same duties. Salary: \$68,780/yr. Send resume to: Bob Miller, PaySys International, Inc., One Mecca Way, Norcross, GA 30093.

Senior Software Engineer-Research, design, and develop code for computer software systems using C++, Java, COBOL, WCE, Internet of TCP/IP Unix and Windows. Analyze software requirements to solve real-time issues with the company's video conferencing products. Requirements include a Master's Degree in Engineering, Technical Discipline or related field. No experience required. Applicants must have unrestricted authorization to work in the United States. Salary \$68,607/year. 40 hours/wk. Respond with two copies of resume to Case #19994090, Labor Exchange Office, 19 Stanford St., 1st Fl, Boston, MA 02114.

Fulltime Sr Programmer Analyst to perform end user requirements study, systems analysis, systems design, coding, implementation, documentation and maintenance support as required by the end user. Perform systems analysis and design support on application software using Developer 2000 on Client/Server Oracle based system. Design, develop, test and implement test software using Oracle. Must have a bachelor's degree in CS, any engineering discipline or related field (foreign degree equivalent accepted). Must have two years of experience in job offered or position with same duties. Salary: \$65,000. Send resume to DataScan Technologies, 1105 Sanctuary Parkway, Suite 190, Alpharetta, GA 30004, Attn: Kimberly.

Programmer Analyst: \$63K/yr: 8a-5p, 40 hrs/wk. Plan, dvlp, test & implant comp prgms & systems using MVS, JCL, VSAM, CICS, COBOL, DB2, Oracle & Visual Basic. Bach or equiv w/Comp Sci or Engg, Electronics or related branch of Engg. 1 yr exp in job offered or as Prgrmr/Application Developer. Job loc: Atlanta, GA. Send resume w/rf# 012 to: SunPhx Data Group, Inc., 3783 Presidential Pkwy, Ste 130, Atlanta, GA 30340.

Oracle Database Administrator II: Provide database and administrative script development support for both Oracle and SQL Server in both the Solaris UNIX environment and the Windows NT environment. create and implement back-up and recovery or performance tuning utilities; establish policies and procedures for Level II DBA to effectively administer the database environment; and provide back-up support to the Level I DBAs. Minimum Requirements: Bachelaurate degree in MIS, CIS, or the equivalent plus three years experience in the job offered or Oracle database administration. Prior experience must include three years experience in Oracle database administration using PL/SQL and development of Oracle database applications. Hours: 8:00 am - 5:00 pm M-F. Salary: \$72,000.24 per year. Must have indefinite right to work in the U.S. Contact: Tipton Bradford PO Box 105179, Atlanta, GA 30348-5179.

Software Engineer wanted to write, debug & maintain highly interactive web applications using Java & HTML, apply object-oriented skills to analyze & design applications, integrate web-oriented applications with backend tech such as RDBMS (Oracle/Sybase/SQL Server); work closely with customers to facilitate & assist their efforts to deploy Web-oriented tech; develop & test client-server or multi-business applications to support Financial and Accounting systems, develop modules, generate business objects and data file tables, and write stored procedures, working with Visual Basic, MS SQL Server, Erwin, Windows NT, Visual Source Safe, SOA Root, Smalltalk, Synchronicity, Data Access Objects, Object Oriented Programming Principles, and Remote Data Objects. B.S. in Computer Science, or Computer Information, or Engineering with 2 years experience in job offered or 2 years experience as Software Analyst or Software Consultant. \$62,920/year. Applicants send two resumes to North Metro, Job Order # GA 633075, 2343 N. Druid Hills Road, Atlanta, GA 30329 or the nearest Department of Labor Field Service Office.

SVI AMERICA CORP. is an information management & technology consultancy co. with offices throughout the US. We work with many organizations to develop integrated solutions that transform their enterprises. By understanding the key components that drive an organization, we are providing tangible results & a competitive advantage to our clients.

SVI America Corp. presently requires Programmer Analysts with the following qualifications: A Bachelor's degree in Comp Sci or Math, Engg, Business Adm, or a related discipline. 1 yr exp in job offered, as well as working knowledge of COBOL, CICS & RDBMS. Must be willing to temporarily relocate to client sites throughout the U.S.

To apply, please contact: HR Dept, SVI America Corp., 15800 John J. Delaney Drive, Suite 250, Charlotte, NC 28277 or E-mail: jobs@sviamerica.com

I.T. Sales/Marketing Manager. Fast growing I.T. company seeks Manager of Sales/Marketing for its PA to manage information technology services & project procurement sales/marketing activities. Will be responsible for directing staff training & performance evaluation to develop & control sales program, establish national & international sales territories, establish business partner relationship, market technical resources & software projects, recommend/approve budget expenditure for research & development work, ensure timely project completion, oversee customer satisfaction & technical/software support, set up control & reporting system. Req. Bachelor's/Equivalent Degree in Computer Science/electronics/communications/related field & 6 yrs of exp. in sales/marketing in the field of I.T. Sal. \$67,000 p/a. Resume to Compunifye Winofsystems Ltd., 1822 Spring Garden St., Ste 226, Philadelphia, PA 19130-3917.

Systems Consultant (Waltham/Boston, MA): Analyze, design, develop, code, test, implement, debug automation aspects for automotive, industrial & high tech industry. Understand customer manufacturing & design processes, product drawings, business rules, analyze & implement them in the s/w apps. Suggest improved design process. Custom configure industrial products to generate parts in real time, produce various design proposals, mechanical validation, produce manufacturing instructions, perform engg computation, geometric configuration using 3D solid modeling, design components of the product, generate solid model & drawing of the configured product. Write scripts & CAD data conversion utilities. Develop user interface using Oracle Developer/2000 forms, MS VB, implement product configuration rules using SellingPoint, database manipulation through SQL/PL/SQL. Bachelor's in Mechanical Engineering or Computer Science w/2 yrs exp in job offered or as Appl. Consultant or Programmer Analyst, req'd Degree may be equivalent. 40 hrs/wk, \$68,000/yr. Send resume & two (2) copies of resume to Case# 19993305, Labor Exchange Office, 19 Stanford St., 1st Fl, Boston, MA 02114.

SYSTEMS CONSULTANT: Provide services to clients in design & development of client-server or multi-business applications to support Financial and Accounting systems, develop modules, generate business objects and data file tables, and write stored procedures, working with Visual Basic, MS SQL Server, Erwin, Windows NT, Visual Source Safe, SOA Root, Smalltalk, Synchronicity, Data Access Objects, Object Oriented Programming Principles, and Remote Data Objects. B.S. in Computer Science, or Computer Information, or Engineering with 2 years experience in job offered or 2 years experience as Software Analyst or Software Consultant. \$62,920/year. Applicants send two resumes to North Metro, Job Order # GA 633075, 2343 N. Druid Hills Road, Atlanta, GA 30329 or the nearest Department of Labor Field Service Office.

IMPLEMENTATION SPECIALIST: Installation of software, database administration, application of software upgrades and writing of SQL scripts to support interfaces or custom reporting and/or a related discipline. 1 yr exp in job offered, as well as functions necessary to make the ERP solution work in client/server environments. Will also assist clients in adapting Oracle solutions to business problems for clients that lack internal technical IT resources in support of new technologies. Requires: B.S. in MIS, CS or other related degree, 6 months experience in Oracle applications development, and knowledge of Oracle applications and Object Oriented Development methodology. 40 hrs/wk (8 to 5) \$80,000/yr. Send two (2) copies of resume/response to Case #20000223, Labor Exchange Office, 19 Stanford St., 1st Fl, Boston, MA 02114.

Computer Professionals Informatica delivers innovative IT solutions to clients nationwide. We have immediate opportunities for both entry level and experienced Programmer/Systems Analysts, Software/Project Engineers, DBA with any of the following skills: Informix Unix, SQL/SQL Server, GUI, DB2, CICS, COBOL, C++ or Oracle or Sybase, CORBA, WinNT, OOD, MFC, Access or PowerBuilder, etc. Req. MS or BS with exp. Attractive salary with excellent benefits. Send resumes to: ATT: John Myers, 3711-C University Dr, Ste 4, Durham, NC 27707 or visit our Web at www.informaticacare.com

EXCELLENCE IN GOVERNMENT INS WANTS YOU

The Immigration and Naturalization Service (INS) has a Telecommunications position open for a talented Manager at the GS-15 level in the Data Communications Branch, Systems Integration Division, Washington, DC. We are in search of a savvy and experienced individual to direct the Service's worldwide data communications network. This Manager should also have experience with reviewing and approving the payment of circuit invoices in the millions annually. Under this individual's direction are the design, deployment, and operation of large-scale data communications networks at several hundred sites spanning national and international locations. Trouble shooting, project management, and problem solving are her/his forte. Knowledge of developing worldwide telecommunications policy or procedures for remote access, firewall strategy, TCP/IP or IPX network address management, and NT Domain/NTS Tree directory services are required. This position offers you growth opportunities. You will gain experience in worldwide LAN and WAN design, satellite communications and the integration of voice, microwave, and long line data communications. A resume of experience that will make you competitive for future jobs will be yours to build. The salary range is \$84,000 to \$110,000.

For information regarding this position access the Internet: <http://www.usdoj.gov> for application procedures. Please refer to vacancy announcement numbers 00-30-001 and 00-30-DE001. This announcement will close on August 18, 2000.

For position specific job questions: please contact Sandra Rosenblatt, (202) 514-2548.

Software Engineer-Deerfield Beach, FL. 40 hrs./week. 8 a.m.-6 p.m., \$56,908/yr. Position requires Master's Degree in Engineering in computer & 2 yrs. exp in job offered or 2 yrs. exp as a computer developer or analyst. Duties include research, design and develop computer software systems in conjunction with hardware product development for medical, industrial applications, applying principles & techniques of computer science, engineering and mathematical analysis. Interacts with clients regarding their software requirements to determine feasibility of design with time and cost constraints, consults with hardware engineers and other engineering staff to evaluate interface b/w hardware & software, & operational & performance requirements of overall system; formulating & designing software system using scientific analysis & mathematical models to predict & measure outcome & consequences of design; developing & directing software system testing procedures; programming & documentation; consulting with customers re: maintenance of software system; may coordinate installation of software system. Must have knowledge of the following computer languages & packages: MS-OFFICE 97, VISUAL BASIC, HTML, JAVA, C, C++, VBSCRIPT, JAVASCRIPT, WINDOWS 95, WINDOWS NT, MS-DOS, UNIX, PERL, SQL, SERVER, MS-ACCESS, SYBASE, CRYSTAL REPORTS, ACTIVE X CONTROL PAD, MS FRONT PAGE, ERWIN, INTEL DEC ALPHA, SUN, HP. Send resume to the Dept. of Labor/Workforce Program Support P.O. Box 10869, Tallahassee, FL 32302, FLJO2090419.

Quantitative Software Engineer wanted by international banking firm in Greenwich, CT to analyze, design, develop, code, test, implement, enhance and maintain systems applications, including real-time data systems used by financial analysts and traders to analyze and trade government mortgage-backed derivatives utilizing C++. Responsible for the development, implementation and maintenance of a complete set of UNIX programs used to download, process, upload and error-check real-time data, including current price, settlement date, factor, coupon rate, volatility, duration and convexity. Utilize knowledge of computer algorithms, quantitative analysis and statistics to design and formulate mathematical models using C++, including term structure of interest rate, monte carlo simulations, prepay, default and risk analysis models, used to project yield/price curves, duration, current balance, volatility, prepay sensitivities, cashflow and option adjusted spreads and to generate financial reports. Maintain databases and overnight batch processes utilizing knowledge of complex computer simulations. Must have a Master's degree in any field and 2 years of experience in the job or as a Financial Analyst, Programmer/Analyst or Research Assistant, including 2 years experience designing and developing mathematical models utilizing C++. Respond to Dave MacWilliams, Greenwich Capital Markets, Inc., 600 Steamboat Road, Greenwich, CT 06830.

PROGRAMMER ANALYST

To design, develop and test computer software for business and scientific applications applying principles and techniques of computer science, engineering and mathematical analysis; analyze software requirements for feasibility of design and hardware interface; design and direct software system testing procedures; and use expertise in visual programming. Visual Interdev 1.0/6.0, SQL Server 6.5/7.5, Visual Basic 5.0/6.0, Internet Information Server 3.0/4.0 and Exchange Server. Requirements: Bachelor's Degree in engineering, computers or a related field and three years of experience as a programmer analyst or computer programmer. Knowledge of Visual Interdev 1.0/6.0, SQL Server 6.5/7.5, Visual Basic 5.0/6.0, Internet Information Server 3.0/4.0 and Exchange Server. Salary: \$62,500/yr. Working Conditions: 8:00 a.m. to 5:00 p.m., 40 hrs/wk. Apply: James J. Mackin, Manager, Beaver Falls Job Center/TCP/ITC, 2103 Ninth Avenue, Beaver Falls, PA 15010-3957. Refer to Job Order No. WEB 12817.

Multiple Openings. Development Engineer. Norcross, GA. Dev. laser processes for refurbishment of industrial & air-based turbine components. Develop refurbishment tasks for laser welding, laser cutting/drilling, TIG welding, thermal spray, furnace brazing, heat treating, design and manufacture of proto-type tooling & machining, including material characterization of repair materials. Also working on Siemens, Anrad, Allen-Bradley and similar laser controllers. Operate laser systems to support Refurbishment. Development/Metallurgical projects. Write technical reports and internal repair documentation. Evaluate components using knowledge of mechanical process and metallurgical engineering. Req. M.S. in metallurgical, material or aerospace engineering and 2 yrs. working knowledge, through academic coursework or experience, of laser welding, high temperature materials, laser material processing and metallurgical thermodynamics. Don Fox, Honeywell, Inc., 85 Beeco Road, Greer, SC 29650.

At Razorfish, we provide strategic, creative, and technology solutions to some of the world's most successful digital businesses. We partner with our clients to plan, design, and build products and services that shape the way the world perceives and interacts with your company. We have openings in the following positions worldwide:

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PROJECT MANAGER
BUSINESS ANALYST
SENIOR BUSINESS ANALYST
INFORMATION ARCHITECT
PRODUCER
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Database Administrator Duties: Analyze business requirements & convert requirements into tech specs for projects. Est., design & develop methodologies & standards for projects. Design, develop, integrate & implement software applications using Oracle database. Resp. for converting legacy to new system using Business Objects & Oracle Express to Oracle database. Migrate legacy universes from legacy database to Archived Database in data warehouse using Extract, Transform & loading tools. Resp. for modifying & enhancing software application data flow diagrams & data structures to plan & implement customization activity through aggregation concepts in ISP Data warehouse. Create & design the database (Physical/Logical/Analytical Processing). Create Archived Database for RISE applications using Oracle Import & Export Utility EOE. 40 hrs./wk., 8:00 a.m. to 5:00 p.m. Salary: \$63,000/year. Send resume to: info@molystone.com to: Moly Stone, CTO, Inc., 800 Delaware Ave., Buffalo, NY 14209.

PROGRAMMER ANALYSTS needed for analysis, design, programming and implementation of UNIX and Windows software using C++ and Visual Basic with Sybase and Oracle databases/utilities.

Bachelors required in Math, Computers, Engineering or any other related field of study, plus 2 years of experience. Must have proof of legal authority to work in the U.S.

Salary: \$62,000/year for a 40 hour work week. Interested applicants submit resume or C.V. to the Phila. Job Bank, 444 N. 3rd St., 3rd Fl., Phila., PA 19123. Refer to Job Order #7063825. Ad paid by An Equal Opportunity Employer.

DATABASE DESIGN ANALYSTS

needed to gather, analyze and model business information needs, design information systems architecture and develop/administer the databases using Oracle DBA tools, Oracle Financials and the Oracle Web Server on UNIX and Windows NT platforms. Masters required in Computers, Management, MIS or any other related field of study, plus one year of experience. Must have proof of legal authority to work in the U.S.

Salary: \$75,000/year for a 40 hour work week.

Interested applicants submit resume or C.V. to the Phila. Job Bank, 444 N. 3rd St., 3rd Fl., Phila., PA 19123. Refer to Job Order #7063814. Ad paid by An Equal Opportunity Employer.

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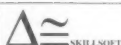
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SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Apache Web Server, Java and JavaScript. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of AS/400, DB2/400, RPG 400, Querry400. Salary: \$104,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Joseph Stralio, Pittsburgh/Allegheny Co. CareerLink, 625 Sixth Ave., Suite 220, Pittsburgh, PA 15216, Job No. WEB113212.

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Title: Software Engineer (Biomedical)
 Description: Young, rapidly growing company seeks qualified software engineer (MS in computer science or biomedical engineering) to integrate clinical and numerical databases in MS Access, SQL Server, and Visual Basic, design and develop complex immunization schedule algorithms according to immunization schedules approved by medical boards, and perform computational modeling of medical systems and pathways. Candidates must also be able to interpret medical terminology. Interested persons, please fax resume to (770) 591-5434 (Attn: Sheila Hutton, HR Director) or email to sheila@scinc.net with salary expectations.

Programmer Analyst. Design, develop, analyze, implement and test Client Server applications using various databases on multiple environments and platforms. Demonstrated ability working with tools such as Visual C++, MFC, Visual Basic. Demonstrated ability working with C++ programming, Java, Unix. Demonstrated ability working with databases such as MS Access, Oracle, Sybase. \$58,000/yr. 40 hrs/wk. 9 am - 5 pm. Must have 2 yrs exp. (or 2 yrs exp. in related occupation of Software Engineer) and B.S. in Comp. Sci., Eng., rel. field/equiv. Send 2 resumes. Case #20001415, Labor Exchange Office, 19 Stanford Street, 1st Floor, Boston, MA 02114.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Apache Web Server, Java and JavaScript. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Apache Web Server, Java and JavaScript. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Ms. Barbara Cole, Greene County Team PA CareerLink, 4 West High Street, Waynesboro, VA 15370-1324, Job No. WEB113271.

Network Administrator: Set up and administer networks. Work with system integration, custom programming and program testing, system migration, load balancing, performance tuning. Design and implement networks and install Novell Network, Windows NT, Lotus Notes. Set up DNS Server, MS exchange server. Demonstrated ability setting up and administering networks. Demonstrated ability implementing networks and installing Novell Network, Windows NT, Lotus Notes. Demonstrated ability setting up DNS Server, MS exchange server. \$60,000/yr. 40 hrs/wk. 8am - 5pm. Must have 2 years exp. in related occupation of Network Engineer and B.S. in Comp. Sci., Eng., rel. field/equiv. Send 2 resumes. Case #20001478, Labor Exchange Office, 19 Stanford Street, 1st Fl., Boston, MA 02114.

Sr. Software Engineer to be responsible for software development for real-time embedded avionics systems; design and development of the CORE Graphics Services Software; incl. graphical API layer and software responsible for rendering graphics on display media. MS in Computer Science or Computer Engineering, 2 yr experience in job offered. Software Engineer or Software Developer. Must have successfully completed Ada programming course, experience must incl. C programming and real-time embedded software development. 40 hrs/wk, 7:30 a.m. to 4:30 p.m., \$56,055/yr. Must have proof of legal authority to work in the United States. Send resume to the Iowa Workforce Center, 800 Seventh Street SE, Cedar Rapids, Iowa 52406-0729. Ref: #1101084. Employer Paid Ad.

Systems Administrator - Monroe Louisiana - Install & maintain Windows NT & database mgmt sys for chain of 5 Chinese restaurants using SQL, implement & admin Acctg & Admin-train sys incl. a POS, payroll sys, employee & customer sys, Electronic Data Exchange sys, mainframe & network exchange sys, maintain & troubleshoot & provide tech support on sys. Strong peripherials & networks incl. LAN & WAN. Req'd BS in CS, MS, or related field + 1 yr as Sys Analyst. Must have exp or knowl. edge in Windows NT, LAN/WAN & SQL. Send resumes/fax to: JMW Management, Inc., Box 4583, Monroe, LA 71201, Attn: Xianhua Wang, President.

Programmer Analyst. Analyze, design, develop, implement and maintain software applications using various databases on multiple environments and platforms. Demonstrated ability working with languages such as C, C++, Visual C++, Demonstrated ability working on multiple platforms such as Unix and Windows (95/NT). \$54,892/yr. 40 hrs/wk. 9 am - 5 pm. Must have 2 yrs. exp. (or 2 yrs exp. in related occupation of Software Engineer) and B.S. in Comp. Sci., Eng., rel. field/equiv. Send 2 resumes. Case #20000546, Labor Exchange Office, 19 Stanford Street, 1st Floor, Boston, MA 02114.

Systems Analyst. Evaluate user requests, analyze operational procedures, identify problems, learn specific input/output requirements, convert project specifications into sequential detailed instructions for coding into computer processable language. Bachelor's Degree in Computer Science or related field of engineering required, plus experience in the computer software industry using MS-DOS, RSX-11, SINTRAN, UNIX, and C. Requirements: Send your resume to the Iowa Workforce Center, 800 Seventh Street SE, PO Box 729, Cedar Rapids, Iowa 52406-0729. Please refer to Job Order IA1101082. Employer paid advertisement.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Oracle Forms 4.5, Oracle 7.3, Pro*C and Developer 2000. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Oracle Forms 4.5, Oracle 7.3, Pro*C and Developer 2000. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Thomas Dembosky, Indiana Job Center, 350 N. Fourth Street, Indiana, PA 15701-2000, Job No. WEB113240.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Java, JavaScript, C++ and SQL Server. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Java, JavaScript, C++ and SQL Server. Salary: \$96,096/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Margaret Weckley, Butler County Job Center, 227 West Cunningham Street, Butler, PA 16003, Job No. WEB113232.

Immediate openings for experienced IT professionals in VC++, Rational Rose, SQL Server, ODBC, API, Unix SVR4, C-Tree, Visual Parse++, etc. Travel req'd. Send resume & salary requirements to HR, Software Systems & Solutions, Inc., 1945 Cliff Valley Way, Suite 220, Atlanta, GA 30329.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Java, JavaScript and C++. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Java, JavaScript and C++. Salary: \$68,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Ms. Sue Notomacola, Fayette County Team PA CareerLink, 32 Iowa Street, Uniontown, PA 15401-3513, Job No. WEB113264.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Oracle Forms 4.5, Oracle 7.3, Pro*C and Developer 2000. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Oracle Forms 4.5, Oracle 7.3, Pro*C and Developer 2000. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Terrence Kinney, Armstrong County Team PA CareerLink, 1270 North Water Street, PO Box 759, Kittanning, PA 16201-0759, Job No. WEB113243.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Progress 7.3, Progress 4GL, UNIX and C. Requirements: Bachelor's Degree or equivalent in Computer Science or related field, knowledge of Progress 7.3, Progress 4GL, UNIX and C. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Anthony Getchick, Westmoreland County CareerLink, 300 East Hills Street, Youngwood, PA 15697-1808, Job No. WEB113239.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in AS/400, DB2/400, RPG/400 and Querry 400. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and five years experience as a software engineer or computer programmer, knowledge of AS/400, DB2/400, RPG/400 and Querry 400. Salary: \$154,291/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. James J. Mackin, Beaver Falls Job Center/TPCL, 1103 Ninth Ave., Beaver Falls, PA 15010-3957, Job No. WEB113235.

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SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise Oracle Forms 4.5, Oracle 7.3, Pro*C and Developer 2000. Requirements: Master's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Oracle Forms 4.5, Oracle 7.3, Pro*C and Developer 2000. Salary: \$89,440/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Ms. Pat Curran, McKeesport/Allegheny Co. CareerLink, 345 Fifth Avenue, McKeesport, PA 15132-2600, Job No. WEB113262.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Progress 7.3, Progress 4GL, UNIX and C. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Progress 7.3, Progress 4GL, UNIX and C. Salary: \$68,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Terrence Kinney, Armstrong County Team PA CareerLink, 1270 North Water Street, PO Box 759, Kittanning, PA 16201-0759, Job No. WEB113267.

SENIOR SOFTWARE ENGINEER to design, develop, test, implement, maintain and support software applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Visual C++, DB2 & C++. Requirements: Master's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Visual C++, DB2 & C++. Salary: \$72,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Terrence Kinney, Armstrong County Team PA CareerLink, 1270 North Water Street, PO Box 759, Kittanning, PA 16201-0759, Job No. WEB113242.

Software engineer to design, develop and test computer programs for business applications, analyze software requirements to determine feasibility of design, direct software system testing procedures using expertise in Visual C++, DB2 & C++. Requirements: Master's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Visual C++, DB2 & C++. Salary: \$72,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Mr. Terrence Kinney, Armstrong County Team PA CareerLink, 1270 North Water Street, PO Box 759, Kittanning, PA 16201-0759, Job No. WEB113242.

Programmer Analyst. Design and develop software programs using C++, Java, object oriented programming paradigm, and class libraries. Work with tools like Visual C++, MFC, Visual Basic, ActiveX, DCOM, on Windows NT and Unix platforms. Work with databases such as MS Access, Oracle, Sybase, SQL Server. \$44,200/yr. 40 hrs/wk. 9 am - 5 pm. Must have B.S. in Comp. Sci., Eng., rel. field/equiv. Send 2 resumes: Case #2000163, Labor Exchange Office, 19 Stanford Street, 1st Floor, Boston, MA 02114.

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Newbridge Networks is an international company specializing in state-of-the-art digital networking communications systems. We've been designing, developing and delivering these systems for 13 years to customers throughout the U.S. and the world. We are recruiting for all types of professionals, including: software engineers; design engineers; systems engineers; principal engineers; support engineers; field support engineers; test engineers; product support software engineers; software engineering specialists; application systems specialists; senior engineering specialists; firmware engineering specialists; training managers; senior and other members technical staff; product marketing managers.

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The San Francisco office of Charles Schwab & Co., Inc. has Staff, Sr. Staff and Director career opportunities in the Schwab Information Technology Enterprise. Specific disciplines include Database Administration, Systems Programming, Programmer Analysts, Information Security Specialists, System Administrators, Architects, Project Managers, Systems Engineers and Network Engineers. Technical Environments: NT, UNIX (Solaris, AIX, HP-UX), MVS, CICS, CICS/6000, SNA, C, C++, COBOL, PowerBuilder, SQL DB2, Oracle, PeopleSoft, Firewalls, Visual Basic, Java, JavaScript, ActiveX, J++ CGI Scripting, HTML, Silk QA Partner, CORBA, DCE, HP-OpenView, Newbridge, Tivoli, Remedy, Legato, Periphonics, CTI, Parallel Sysplex, LDRPS, MQ, NetIO, ATM, PBX, Electronic Output, Cisco, Sendmail, Imaging, Electronic Messaging, AFP. We offer the competitive salaries, excellent incentives and the comprehensive benefits of a recognized industry leader. Email your resume, indicating Job Code SK/99/C to: skchwalb@cschwab.com. Charles Schwab & Co., Inc. Member SIPC/NYSE, 3030, 5070, Equal Opportunity Employer.

Telecom Engineer: Entails developing new simulation modules for new devices, implementing enhanced routing algorithm for network simulation and animation. Researching various kind of simulation speed-up algorithms. Responsible for customized projects. These duties are carried out using Microsoft Visual C++ and Visual Basic in a Windows environment. Requirements include: B.S. in Computer Science or Mathematics AND two (2) years experience in job offered or two (2) years experience in development or management of telecommunications system. Candidate must also possess demonstrated expertise in developing applications for animation and 3-D graphics using C++ or Visual Basic in a Windows environment, and demonstrated expertise performing discrete event simulation of communication and data communication network. Salary: \$46,000 per year, Monday to Friday, 9:00 a.m.-5:00 p.m. Submit two copies of resume to: Case Number 19960332, Labor Exchange Office, 19 Stanford St., 1st Fl., Boston, MA 02114. EOE. Applicants must be U.S. workers eligible to accept full-time employment in the United States.

Programmer Analyst - Legacy Systems (AS/400) - Multiple Openings

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Travel may be required. Salary DOE. Send ad and resume to: Ad# 312817, Attn: Patty McNally, 2100 East Grand Avenue, El Segundo, CA 90245. Please indicate specific title/location of job for which you are applying on your application letter.

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Consumer Giants to Launch Worldwide B2B Standards

New rules expected to clean up e-commerce data exchange

BY JULIA KING

HOME DEPOT and Procter & Gamble are among a group of manufacturing and retail companies worldwide that later this month will begin testing the first global standards for business-to-business e-commerce in the consumer goods industry.

The new Global Commerce Internet Protocol sets basic rules for data access and security, message content and the flow of information between trading partners around the world.

The protocol was approved last week in Paris — only three months after it was first proposed — by 40 large corporations and eight trade associa-

tions representing 850,000 companies.

"This is the equivalent of getting EDI [electronic data interchange] in place all over again," said Ron Griffin, CIO at Atlanta-based The Home Depot Inc. and a board member of the Global Commerce Initiative, which adopted the new standards.

Less Inventory

With buyers and sellers using the same formats to describe products, send and receive electronic purchase orders and transact other business over the Internet, Griffin said he expects to shave product lead times by as much as one week. "That means less total inventory in the supply chain," which should help

companies slash overall costs, he said.

The Global Commerce Initiative, set up last October, comprises some of the world's biggest manufacturers and retailers, including U.S. members The Coca-Cola Co. in Atlanta and Wal-Mart Stores Inc. in Bentonville, Ark., as well as London-based Marks & Spencer PLC and Britain-based Tesco PLC.

The consumer goods industry's largest Internet marketplaces — Transora, WorldWide Retail Exchange, CPG-market.com and GlobalNetXchange — also will adhere to the new standards.

The Global Commerce Initiative's main goal isn't to set formal policies for worldwide Internet-based marketplaces, said Peter Jordan, project leader for

the new protocol and also director of systems at Kraft Foods Europe.

"Exchanges are independent ventures," Jordan said in a statement. "It is not [our] job ... to influence the speed and scope of their development."

Rather, the group's intention is to facilitate instantaneous communication of clear and

accurate information.

That's something EDI has never truly accomplished in more than two decades of use at Procter & Gamble Co., said Ralph Drayer, senior vice president of efficient consumer response at the Cincinnati-based consumer goods manufacturer.

"EDI has been around for 20 years, but there's 14 different EDI standards that P&G has [to follow]," Drayer said. "It requires different processing."

With all buyers and sellers using a single global standard for purchasing a product like P&G's Pringles potato chips, it will be much easier and faster for P&G — and other suppliers — to figure its total sales at a particular worldwide retailer, such as Wal-Mart.

The Global Commerce Initiative said its work will extend beyond the Internet to include other technologies, such as a worldwide bar-code standard.

For more information on the standards, visit www.globalcommerceinitiative.org.



THE STANDARDS are like "getting EDI in all over the place," says Home Depot CIO Ron Griffin

Continued from page 1

Web Retailers

ing to BizRate.com, an online customer-service rating firm in Los Angeles.

But slowly — thanks to major information technology systems-integration work — that picture is starting to change, with some of the more noticeable improvements being made on the logistics and fulfillment fronts, according to managers attending last week's electronic-logistics conference run by the International Quality & Productivity Center (www.iqpc.com).

"Back-end integration has always been on companies' to-do slide for the future, and it's beginning to happen," said Tim Minahan, an analyst at Boston-based Aberdeen Group Inc.

"The real nirvana is to have machine-to-machine communication, or in essence, removing manual intervention at as many steps as possible," Minahan added.

To get on a next-day delivery cycle, explained Kurt Hagen, vice president of e-commerce at Richardson, Texas-based Fossil, "we had to remove all human interaction with an order between the Web site and our warehouse."

"Now, the first time a human interacts with an [online] order is when it pops up on the screen of a radio-frequency scanner in our warehouse," Hagen said.

Because the Web site is integrated with legacy inventory systems, online shoppers can see — and buy — only those items that are in stock and ready to ship the next day. The result: no costly back orders.

Next-day delivery has also worked to extend Fossil's sales

periods prior to special occasions, such as Father's Day.

"Previously, we'd see a selling spike five to seven days before an occasion. But with next-day delivery, the marketing team can go online with

technology, took six months.

Micron PC also is relying on XML to integrate retail and factory systems so it can transmit real-time order and shipping information from legacy inventory and manufacturing systems at Micron's Idaho factories to customers at Best Buy's Web-based kiosks.

"With XML, we get orders sent directly to the factory from the point of sale and send back an available-to-promise date to the customer right then," said John Janson, director of worldwide distribution at Micron Electronics Inc.

Washington-based online college text retailer VarsityBooks.com Inc. recently integrated its e-mail customer-notification system with its inventory maintenance system. The result: Bookpage, a system that offers to alert browsers in search of a special text when it arrives at the bookseller's warehouse.

"People loved it. It also had the impact of getting us information, such as the names and addresses of Web surfers who we could eventually market to," said Andrew Green, vice president of operations and business development at VarsityBooks.com.

The new, integrated system also yields valuable demand information in an industry where sales history can be sketchy.

"Because a lot of college texts are new editions or [titles], there's no sales history on them. With Bookpage, we know how big of a problem it is if a book isn't in," Green said.

"Technology enables you to make up stuff that has never been done before," he added. "That's why I advise people to hang out with the techies and get to know them. They can put things together and make things happen that you never thought of."

The real nirvana is ... machine-to-machine communication.

TIM MINAHAN, ANALYST,
ABERDEEN GROUP INC.

promotions two days before [the holiday], so we've also extended the selling period," Hagen said.

Fossil's integration project, which relied heavily on XML

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FRANK HAYES/FRANKLY SPEAKING

Trading places

IT'S A CRAZY TIME, NO? The FBI is busy implementing an open-everybody's-e-mail project called Carnivore. Toys R Us sent customer information to a third party after promising it would be kept confidential. Web businesses of every kind are surreptitiously tracking their customers. Meanwhile, at their annual convention in Las Vegas, hackers are preaching the gospel of better security and privacy and calling on would-be Internet juvenile delinquents to act more responsibly.

How crazy is that?

OK, let's be clear about this: The hackers haven't turned their Def Con convention into a high-tech church picnic. Last week, attendees reportedly set off smoke bombs, dumped bubble bath into Jacuzzis and poured concrete down toilets, according to *Computerworld's* Ann Harrison. (See story on page 40.)

But there were also days of presentations on security holes and how to plug them and warnings about the limits of new security technologies such as biometrics. And yes, members of the Cult of the Dead Cow (of Back Orifice fame) really did appeal to young hackers to stop vandalizing Web sites, and other speakers encouraged a learn-and-move-on approach instead of using holes that hackers uncover to cause problems.

That's what the bad guys, your worst nightmare, are pushing these days: security, privacy and responsible behavior. Crazy, huh?

And what are the good guys promoting? Doubletalk, legalistic evasions and sneakiness.

Yes, the FBI swears its Carnivore e-mail surveillance system will examine only messages to or from suspected criminals. But we all know they'll have to scan at least parts of every message the system encounters. They're still opening everyone's mail.

Yes, Toysrus.com says it meant no harm when it gave application service provider Coremetrics Inc. access to its customer data. But regardless of whether that action was harmful, Toysrus.com's online privacy statement said the data wouldn't be shared with third parties. Period. (That privacy statement has since been amended to state, "We may also utilize a service provider to assist in aggregating guest information. We may then share such aggregate information with prospective partners and advertisers.")

And yes, we all justify the cookies and invisible GIFs and JavaScript and other techniques we use to spy on our customers to squeeze more data out of what they do on the Web. We like to tell ourselves that our customers don't mind these invasions of their privacy — it's just, well, what you do on the Web.

But if we really believe they don't mind, why do we go to such great lengths to be sneaky about how we collect that information?

There are two likely answers to that question.

One is that we *don't* believe it: We're just lying to ourselves so we don't feel guilty.

The other is that we really haven't thought about whether any of this is really a good idea. We can do it — other people are doing it — so why not?

But we should think about it. If we don't, we're as irresponsible as any pimply-faced hacker wanna-be who ever launched a virus or brought down a Web site without even considering the consequences — just because he could.

Look, customers do business with us because they trust us. They want to trust us. They'd prefer to trust us. We're the good guys, remember?

But if we lie to them or spy on them and then give them a lot of doubletalk and improbable excuses, they'll stop trusting us. And they'll stop doing business with us. It's that simple.

If we don't take their privacy seriously — as seriously as customers themselves take it — we'll drive them away, demolish our credibility and destroy our businesses.

And how crazy is that? ▀

Hayes, *Computerworld's* staff columnist, has covered IT for more than 20 years. His e-mail address is frank_hayes@computerworld.com.



Why do we go to such great lengths to be sneaky?

SHARK TANK

THERE'S A RIGHT WAY . . . A top-notch computer wonk wants some very pricey database training. The IT director pilot fish takes the request to the top. Jeez, says the president, concerned with high turnover, "what if we train him and he leaves?" Director fires back, "What if we don't train him and he stays?" The prez OKs it. Says the fish, "Sometimes, life is good."

. . . AND THERE'S A WRONG WAY This pilot fish begs for SAP training. Her company has a screaming need for SAP support. She's already got systems integration experience and besides, she's a career employee. But nope, no training for her: The bosses say talented people who get training will probably leave. Instead, they hire three SAP contractors at way more than IT staffers make. But it does mean there's a new answer to the "can we get training" question, says the fish: "Now we can't afford it."

SHAKE, RATTLE AND ROLL Custom software outfit finishes a warehousing application that's installed easily for the customer's first three sites. Then warehouse No. 4 sends the server for the software to be installed — "in a surplus box with no padding at all," says this pilot fish. "The box rattled and pieces fell off when we opened it. We couldn't even get a floppy into the drive to boot the machine, it was so badly damaged." And the customer whose IT manager boxed up this

catastrophe? Who else, says the fish: a big package-express company.

PILOT FISH HASN'T BEEN ABLE to back up the departmental server for two months — one tape drive after another goes south. After a third drive fails too, the vendor's tech support guy is sympathetic. "Oh, those just aren't real reliable," he says. "But we'll be glad to send you another unit" — of the same model.

WHEN TWO COMPUTERS DISAPPEAR from ex-employees' desks, management takes action, rekeying the doors and putting the new keys into only managers' hands. But with crunch time for a couple of major projects, a pilot fish end up working into the wee hours with no spare key to lock things up. So one luckless fish in each building is stuck at work until morning — unless he can find a manager who'll show up with a key at 3 a.m.

This IT pilot fish at a local government agency knows it needs to draw up IT user policies. But the agency director spikes them every time. "Policies are not allowed," says the boss. "If we make a policy, then we may be forced to live by it, too." OK, so live by this one: sharky@computerworld.com. If your story goes live, you get a snazzy Shark T-shirt. And don't forget to catch the Daily Shark online at computerworld.com/sharky.

The 5th Wave

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It's another cow box mutilation, Sheriff. Look how cleanly the case has been severed. And if my hunch is right, you won't find the motherboard within a thousand miles of here.



E-mail: richman@the5thwave.com

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